

E-Mail Transmittal Date: 12/27/2011

From: Tamara Langton, EPA

To: Anthony Isolda, CDM

HLB BRA Comprehensive Comments as of Dec. 27, 2011

Sorted by Oct. 2011 BRA Section and Page Numbers

The latest EPA responses are highlighted in yellow

New comments on the Oct. 2011 BRA are in blue

COMMENT LABEL KEY

A - # Comments: General

B - # Comments: January 2009 BRA – Eco portion only.

C - # Comments: July 2009 BRA – HH Portion.

D - # Comments: April 2010 BRA.

E - # Comments: New EPA Comments on October 2011 BRA

GENERAL COMMENTS

- **#A-1 General Comment: EPA Superfund Regional Screening Levels (Marcia Bailey, 6/11/2010):** EPA Region 6 screening levels no longer exist. Instead, as of December 2009, all media contaminants must be compared with the current EPA Superfund Regional Screening Levels (RSLs) to determine the Contaminants of Potential Concern (COPCs). There are only a handful of differences between the Region 6 screening levels and the current RSLs; however, the final BRA must use – and cite – the more recent EPA screening data within the text and tables. These RSL tables and associated information are available through Web portals of EPA Regions 3, 6 and 9.

***KTR Response (Revision 9, Oct. 2011):** Regional Screening Levels have been updated using the web portal Summary Table dated June 2011.*

EPA Response #1 (Marcia Bailey & Marcia Knadle, 12/20/11): TCE and methylene chloride have both had risk changes since June 2011. These changes need to be reflected in the BRA. See specific new comments later in this document, specifically comment #E-9.

- **#A-2 General Comment: TPH as a “Presumptive” Primary COPC (Marcia Bailey, 6/11/2010):** TPH is to be listed as a presumptive primary COPC within the BRA (for both Human Health and Ecological Receptors), until EPA has sufficient information about its site-related concentration in environmental media.

***KTR Response (Revision 9, Oct. 2011):** TPH has been listed as a presumptive primary COPC. The HHRA now indicates that any additional sampling should include TPH analyses.*

EPA Response #1 (Dec. 2011): The EcoRA also lists TPH as a presumptive COPC. Other than noting this, this response is acceptable.

- **#A-3 General Comment: “Grouping” of Well Data for the HRIA and Breen Areas (All; many revisions):** There is still an issue with this approach in general, and the explanation for why these were grouped specifically.

KTR Response (Revision 9, Oct. 2011): *Grouping of well data for the HRIA and Breen Areas has been altered to match the map provided by EPA (September 23, 2010 e-mail from Marcia Knadle). Downgradient wells (west of Labree Road) are evaluated on a well-by-well basis. Please see response to Comment 8 under “EPA Response to Parametrix for information on how exposure point concentrations were calculated.”*

EPA Response #1 (Marcia Knadle, 12/20/11): There seems to have been considerable confusion about the subareas I laid out in Option 1 of my 9/23/10 email, including which data points should be included within those areas, and what that meant for the “downgradient” well list. Somehow, what I designated as the Thurman Berwick Creek Area group became the Downgradient list. As a result, the wells/borings in that area (which we consider one of the source areas) didn’t get grouped for the purposes of producing a GW EPC, and NONE of the wells or borings in the area downgradient (west) of Labree Road (what we’ve been calling downgradient in the RI and the only area truly downgradient of all the sources) were quantitatively evaluated in the BRA. Given that it’s actually the area most likely to have domestic wells eventually installed, that’s a major omission. In addition, only the wells and borings included on the base map I used in my 9/23/10 email were included on the lists in Table 2-2. That just happened to be the base map I had available in pdf for the purposes of showing areas for grouping wells in the 3 source areas. It was not intended to show the specific data points to be used, just the areas. As a result, some borings were included, but some weren’t, without any good technical reason for excluding them. See more specific comments on this later in this document.

- **#A-4 General Comment: References to Cancer Risks (Marcia Bailey, 6/11/2010):** All references to cancer risks should be phrased explicitly as “excess individual lifetime cancer risks.” In most places, only the term “cancer risk” is used. This should be adjusted globally in the document.

KTR Response (Revision 9, Oct. 2011): *References to cancer risk have been altered to read “excess individual lifetime cancer risks.”*

EPA Response #1 (Tamara Langton, Dec. 2011): It appears that in spot checking parts of Revision 9, it is written as “individual excess lifetime risk” rather than what is above. Whether excess is before individual or after, it should be consistent throughout the report.

- **#A-5 General Comment. Data Gaps/Uncertainties/Limitations (All):** As you are aware, there are a number of “gaps” in the current remedial investigation data, e.g., limited groundwater and air sampling data especially in the downgradient areas, limited TPH sampling data across the site. These gaps in data lead to limitations on the use of the data and uncertainties when estimating future human health and environmental exposures. To identify these gaps and the need for additional data, a separate memorandum is being prepared by EPA. The relevant information from this memorandum shall be inserted into Sections 2.4.2 and 3.5.4 of the final BRA report upon direction by EPA.

KTR Response #1 (Revision 7, April 2010): *The referenced memorandum describing data gaps and the need for additional data was updated and incorporated into the September 11, 2011 Draft Final RI Report. Section 2.4.2 and 3.6.4, as well as Section 4 of the BRA report, were revised to incorporate current information on data gaps and the need for additional data from the September 2011 RI Report, as needed.*

KTR Response #2 (E-mail from CDM dated 9/2/2011 re: Risk Assessment Uncertainties):

“ ... One issue to note on the risk assessment... In incorporating the assessments we conducted for the uncertainty section, it became apparent that the toxicity tables differ from those in the main body of the report because the new assessments were done with current toxicity information and methodologies (2011) vs. the methodologies used in the report (2008).

One option is to re-do the main body spreadsheets with the newer numbers, but that is a significant effort beyond the current scope of the risk work that wouldn't end up being a straightforward fix as the inhalation methodology has changed since the trench spreadsheets were created.

To deal with this issue, we've added some text to the introduction to indicate that “This iteration adds some information in the uncertainty section.” Some text will also be added to the part of the uncertainty section that discusses toxicity factors to explain that some of the toxicity factors and methodologies have been updated since the previous production of the report, and then list changes to risk drivers (such as TCE went up by X amount”) and that incorporation of the toxicity factors and methods may alter the risks (we can add specifics such as ... X times higher or lower ...). ..

Also ...

We currently do not have any documented background in the report about why TPH, methylene chloride and tetrahydrofuran are listed COPCs. We didn't make any edits to the report regarding COPCs, but will find/add additional information explaining conclusion as COPCs (e.g., in the case of TPH, it is a presumptive COPC).

EPA Response (Dec. 2011): See specific comments on uncertainties in the Uncertainties and Limitations section of this document.

- **#E-1 General Comment (Marcia Bailey, 12/20/2011):** Globally change references to "cancer toxicity" to "cancer potency."
- **#E-2 General Comment, Vinyl Chloride Plume around Building B (Marcia Knadle, 12/20/2011):** There is something we'd completely missed earlier and now realize has to be considered for the Breen property. There's a vinyl chloride plume around Building B in the shallow zone of the shallow aquifer that's significant enough to potentially rival the PCE plume in the SW corner Breen property for GW risk. The risk numbers need to be run to see if the GW risk is actually higher. If so, it will need to be included in the BRA as the basis for the Breen GW risk for the future worker scenarios. If not, it may be sufficient to note in the text that other areas of the Breen property also have fairly high GW risks, but that the SW corner is a conservative proxy for the GW risk component over the entire property. Fortunately, it's not a long list of wells/borings. We think there will need to be a trench worker scenario run there as well. See more specific comments later in this document.
- **#E-3 General Comment (Tamara Langton, Dec. 2011):** Globally change references of the HRIA United Rentals "maintenance building" to "paint shop." This will then comport to revised name in the RI report.

ACRONYMS AND ABBREVIATIONS

- **#D-20, Page iv, Acronyms and Abbreviations:** Add ESL (Ecological Screening Level) to the list of acronyms.

KTR Response (Revision 9, Oct. 2011): The acronym has been added.

EPA Response (Dec. 2011): This response is acceptable.

- **#E-4, Page v, Table of Contents (Marcia Bailey, 12/20/2011):** The table of contents refers to two sets of tables for inhalation tox/potency values: 2-9b, and 2-9d; and 2-13b and 2-13 c. See specific comments on these tables in the TABLES section of this document.

SECTION 1 INTRODUCTION

- **#E-5, page 1, 1st paragraph (Tamara Langton, Dec. 2011):** In the previous definition of the site, the Thurman Berwick Creek area is its own area within OU2 and the downgradient areas referred to “west of Labree Road.” In addition, as commented on in #D-21, the description of the site needs to be consistent with the RI report. It is not consistent with the Sept. 2011 version. CDM may want to consider revisiting the April 2010 RI description.
- **#E-6, page 1, 2nd paragraph (Marcia Bailey, 12/20/2011):** Remove “and regional” from the second to last sentence and delete “Region 10 Supplemental Human Health Risk Assessment Guidance (EPA 1991a) from the lists of guidance and from the Reference section (unless it was specifically used and cited – I did not find this), as that document is not current. Please delete any guidance document listings that were not specifically relied upon for quantitative or qualitative included in the BRA. Ecology’s CLARC tables should be included, as it was used for vinyl chloride potency.
- **#E-7, Page 1, footnote 1 (Marcia Bailey, 12/20/2011):** Footnote 1 should be removed as it is unnecessary, since the BRA text discusses only actual air sampling results in terms of estimating risks. If there are references to J-E modeling, they should be limited to a description of how it was not quantitatively successful for predictions of indoor air concentrations is included.
- **#E-8, Page 1, footnote 2 (Marcia Bailey, 12/20/2011):** Footnote 2 should be revisited once new TCE and methylene chloride (and possibly PCE, if available on IRIS before the new BRA version is complete), noncancer toxicities and cancer potencies have been incorporated into the BRA. The point is that including new toxicity and potency values only in the uncertainty section is insufficient if the differences in risks and hazards are significant, and in any case contributes to non-transparency to the reader.
- **#E-9, Page 2 (Marcia Bailey, 12/20/2011):** Add RAGS Part B (Development of PRGs) (U.S.EPA 1991) and RAGS Part F (Inhalation) (U.S. EPA 2009) to the list of guidance. RAGS Part B, p. 20, section 3.1.1 includes the following language that is pertinent to this risk assessment:

Under residential land use, risk from surface water or ground-water contaminants is assumed to be due primarily to direct ingestion and to inhalation of volatiles from household water use...Additional exposure pathways (e.g., dermal absorption) are possible and may be significant at some sites for some contaminants, while perhaps only one exposure pathway (e.g., direct ingestion of water only) may be relevant...In any case, the risk-based PRG for each chemical should be calculated by considering all of the relevant exposure pathways.”

This language supports EPA's repeated requests that the BRA include the inhalation pathway when considering risks and hazards associated with use of groundwater as tap water. Furthering this request are the EPA screening levels tables for inhalation for TCE, which shows that the carcinogenic screening level for TCE considering ingestion only is 1 ug/L, 6.6 ug/L for dermal contact only, and 0.86 ug/L for inhalation only (with a combined screening level of 0.44 ug/L). The inhalation-only RSL for noncancer TCE toxicity likewise is lower than either the ingestion or dermal contact RSLs. This demonstrates that, for at least some VOCs, the inhalation component of inhalation exposure to tap water drives the screening level, and ultimately the cleanup level, and should be included in the risk assessment. The equations for tap water RSLs (and all other RSLs) on the RSL Web site can be rearranged to solve for risks and hazards, based on Site contaminant EPCs.

RAGS Part F is important because it shows how OSWER has evolved to new equations for inhalation that do not include the consideration of body weight or inhalation rates, consistent with the current science. RAGS Part F informs both RAGS Parts A and B as well as the RSL equations. RAGS Part B equations for tap water should be considered to supersede RAGS Part A exposure assumptions (and for soil, the EPA Soil Screening Guidance documents supersede some soil algorithms that are presented in RAGS Part B). Current algorithms for many exposure scenarios at Superfund sites are contained in the RSL Web pages, and can readily be used for risk assessment purposes (rearranged to calculate risks and hazards, as necessary).

SECTION 1.1 BACKGROUND

- **#D-21, Page 1-2, Background, second paragraph:** Please ensure that the description of the site is consistent with how it is being described in the RI and FS reports, especially when describing the “downgradient” areas.

Commented [TL1]: Now Page 1 under the Intro section.

KTR Response (Revision 9, Oct. 2011): The background discussion has been made consistent with the description presented in the RI and FS reports and, in particular, with the description of “downgradient” areas.

EPA Response (Tamara Langton, Dec. 2011): The descriptions are not consistent.

- **#D-22, Page 1-2, Background, third paragraph, second sentence:** Change the last ½ of this sentence to read “... aquifer has not been shown to be contaminated.”

KTR Response (Revision 9, Oct. 2011): The change has been made.

EPA Response (Tamara Langton, Dec. 2011): The lower aquifer is no longer mentioned in the background section. It should be mentioned at the end of the second paragraph on page 2.

- **#D-23, Page 1-2, Background, third paragraph, third sentence:** Delete “... just up gradient of where the plumes from these two sources commingle.”

KTR Response (Revision 9, Oct. 2011): The change has been made.

EPA Response (Tamara Langton, Dec. 2011): Commingling of plumes is no longer discussed in the background section; therefore, the response is acceptable.

- **#E-10, Page 3, 1st paragraph, 3rd sentence (Tamara Langton, Dec. 2011):** The reference for the estimated volume of the release should be cited and included in the Reference Section.

- **#E-11, Page 3, 4th paragraph, last sentence (Tamara Langton, Dec. 2011):** This sentence should be deleted from this paragraph. Please refrain from the term “site-wide” or “regional” plume as there appears to be a number of plumes across the site.

- **#E-12, Page 3, 6th paragraph, 1st sentence (Tamara Langton, Dec. 2011):** Re-write to say: “Currently, the extent of the PCE groundwater plume downgradient of the source areas is not known, but it appears to have migrated approximately 3,000 feet west of Labree Road based on ?.” (or can cite report). The approx. length needs to be consistent with what is being stated in the RI report.

SECTION 2.1.3 SELECTION OF CHEMICALS OF POTENTIAL CONCERN

- **#C-6, TPH, and other comments concerning the lack of inclusion of TPH compounds as COPCs (Marcia Bailey on the July 2009 red-line version):** In the new language in section 2.1.2 of the redline version, last sentence, one of the two uses of the word “further” should be removed as redundant.

In the new language on page 2-4 of the redline version last sentence under “Breen Property,” there is reference to “future iterations” of this BRA. That language is also found in new language under “Primary COPCs” on page 2-5 of the redline version. In various other locations in this version of the BRA, there are references to future “addenda” or “updates” to the BRA. The descriptions should be consistent (I don’t know which is anticipated by the RPM), because “future iterations” implies complete new documents, while the others do not. In the new language on the same page under “Berwick and Dillenbaugh Creeks,” last sentence, the word “should” should be “will” to comport with language in the “Primary COPCs” section that follows.

KTR Response #1 (Revision 7, April 2010):

- *The last sentence of Section 2.1.2 changed to “Further, as discussed in greater detail below, environmental...”*
- *Last sentence in Berwick and Dillenbaugh Creeks in Section 2.1.3 changed to “Finally, given that gasoline was detected in one groundwater sample at the HRIA, gasoline will be analyzed in Dillenbaugh Creek following future sampling efforts (neither diesel #2, gasoline, or heavy fuel oil were detected in seven surface water samples collected from Berwick Creek).*
- *Last sentence in 1st paragraph in HRIA section of Section 2.1.3 changed to “However, as discussed later in this report, concentrations of gasoline and other petroleum hydrocarbons will be evaluated during further sampling efforts at the Site, with results incorporated into a future risk assessment.”*
- *Last sentence in Conclusions changed to “As new information is obtained, new risk assessments will be performed.”*

EPA Response #1 (Marcia Bailey, 5/6/2010): TPH is to be listed as a presumptive COPC until EPA has sufficient information to rule it in or out as a definite COPC.

KTR Response #2 (Revision 9, Oct. 2011): TPH has been listed as a presumptive COPC.

EPA Response #2 (Tamara Langton, Dec. 2011): This response is acceptable.

- **#C-7, Section 2.1.3, Selection of Chemicals of Potential Concern:** The original comment was Comment #4 from Marcia Bailey's 5/7/2009 memo on the January 2009 BRA:

Commented [TL2]: Now Pages 6 thru 10.

Original Comment 4: Inorganic chemicals should not be excluded as soil COPS if they exceed risk-based screening levels but are lower than Washington state background concentrations. They should be carried through the risk assessment. In the risk characterization, there should be a discussion of the source of the background concentrations and a presentation of how they compare with concentrations at the site. There also should be a discussion regarding what organic COPCs (including gasoline) were associated with soil samples that contained exceedances of risk-based concentrations of inorganics. Subsequently, a risk management decision can be made to not include the chemicals further in site considerations, if appropriate

KTR Response #1 (Version 6, July 2009): *In the HRIA, none of the concentrations for any inorganics exceeded its respective screening value. For those chemicals lacking a screening value, but for which a Washington state background level is available, maximum concentrations never exceed the background level. Accordingly there does not appear to be any basis for identifying any inorganics as COPCs.*

EPA Response #1 (Marcia Bailey, 7/27/2009): The response to my comment did not result in changes to the text. While the explanation given in the response to EPA may be true, it is not reflected in the text. If it is correct that no inorganic compound with a risk-based screening level exceeded that level, that should be stated. Consideration of background concentration in that circumstance would be unnecessary. Background is considered when acceptable risk levels are exceeded. The way the text is written implies that only Ba, Co, Cu, Se, V and Zn did not exceed risk-based screening levels. The language needs to be accurate and transparent.

KTR Response #2 (Revision 7, April 2010): *Changed text in second paragraph in the HRIA section of 2.1.3 to reflect that inorganics were first compared to risk-based benchmarks. If there was no benchmark available, or if background concentrations are greater than risk-based benchmarks, the concentration of the compound was compared to Washington background from Ecology (1994).*

EPA Response #2 (Marcia Bailey, 5/6/2010): The response is acceptable.

- **#E-13, Page 7, item 1 (Tamara Langton, Dec. 2011):** The Thurman Berwick Creek (TBC) area should be separate from the "downgradient west of Labree Road" area.

- **#E-14, Page 7, item 5 (Marcia Bailey, 12/20/2011):** Update screening benchmarks for Site COPCs in Tables 2-3, 2-4 and 2-5 to reflect changes in the November 2011 RSLs and IRIS, when changes in IRIS have not yet been updated in the RSLs (specifically, methylene chloride and PCE), and change the reference to EPA (2011) to November 2011 in the Reference section on page 62. (There have been three revisions of the RSLs in 2011).

- **#D-24, Section 2.1.3, Selection of Chemicals of Potential Concern, Page 2-3, 5th number, second to last sentence:** Per comment from Julius Nwosu, please ensure that you use the most current EPA water quality criteria version (is there a 2009 version)?

Commented [TL3]: Now Bullet 5 on page 7.

KTR Response (Revision 9, Oct. 2011): EPA water quality criteria reference has been updated to the 2009 version.

EPA Response (Tamara Langton, Dec. 2011): Bullet 5 on page 7 now references EPA 2009b which is the 2009 National Recommended Water Quality Criteria. The response is acceptable.

- **#D-25, Section 2.1.3, Selection of Chemicals of Potential Concern, Page 2-4, Breen Property, second to last sentence:** Were petroleum organics "evaluated," as is written in this sentence, or were they just "detected?"

Commented [TL4]: Now on page 9, 1st partial paragraph.

KTR Response (Revision 9, Oct. 2011): The word "evaluated" has been changed to "investigated."

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

- **#E-15, Page 9, Downgradient Areas (Tamara Langton, Dec. 2011):** Which sample location was included in the Downgradient Areas? See Comment #A-3.

- **#D-26, Section 2.1.3, Selection of Chemicals of Potential Concern, Page 2-5, Primary COPCs:** Need to add that TPH is a presumptive primary COPC (see earlier comments on this).

Commented [TL5]: Now on pages 9 – 10.

KTR Response (Revision 9, Oct. 2011): TPH has been added as a presumptive COPC.

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

SECTION 2.2.3 EXPOSED POPULATIONS

- **#D-27, Section 2.2.3, Exposure Populations and Pathways, Page 2-7, 1st full paragraph, 2nd sentence:** This sentence states that exposure to contaminated groundwater by ingestion or direct contact (dermal) were not current pathways due to municipal water supply availability. However, Table 2-6 lists these pathways as both current and future for the HRIA, Breen and Downgradient Areas geographic locations.

Commented [TL6]: Now page 12.

KTR Response (Revision 9, Oct. 2011): Table 2-6 has been altered to indicate groundwater ingestion is a potential future pathway.

EPA Response (Tamara Langton, Dec. 2011): Table 2-6 now lists groundwater ingestion only as a potential future pathway. The response is acceptable; however, see comment #D-52 regarding other comments on Table 2-6.

- **#E-16, page 12, Groundwater (Julius Nwosu, 10/12/2011):** The assumption made regarding the unlikelihood of dermal exposure with shallow groundwater by construction worker receptor during excavation because of the depth to water table of 6 to 15 feet may not be true because depth to water table in the HRIA is variable and could be as high as 2 feet bgs. Marcia Knadle, the EPA Hydro for the site, thinks that the average trench depth to water table set at 5 feet for the HRIA is incorrect because the groundwater level in the area has seasonal variation, and using one value will be inappropriate. Therefore, she thinks we should use a tiered approach: Winter/Spring level should be set at 3 feet; and Summer/Fall should be set at 5 feet.

- **#D-28, Section 2.2.3, Exposure Populations and Pathways, Page 2-8, Groundwater, 1st partial paragraph, last sentence:** There is still an issue with "lumping" groundwater data from wells in the HRIA and Breen properties to evaluate risks.

Commented [TL7]: Now on page 12, last paragraph.

KTR Response (Revision 9, Oct. 2011): Approach has been adjusted to group wells as directed by EPA.

EPA Response (Marcia Knadle, 12/20/2011): See comment #A-3 regarding grouping of wells.

- **Page 13, Soil: See Comment #C-1 under Section 2.4.1.**

- **#D-29, Section 2.2.3, Page 2-8, Summary of Potentially Complete Exposure Pathways, HRIA and Breen Property, indoor commercial/industrial worker and construction/utility worker receptors:**

Commented [TL8]: Now pages 14 – 15.

a) These receptors do not match those in Table 2-6. These should be consistent otherwise it makes it difficult to compare the text with the Table.

EPA Response (Tamara Langton, Dec. 2011): It still does not appear to be consistent. For example, on page 14 for HRIA and Breen Property it lists an indoor commercial/industrial worker as a receptor class, and yet there is no such receptor listed in Table 2-6. Table 2-6 has a commercial worker listed and well as a commercial/construction worker listed, but these aren't listed on Page 14. Please explain why the difference.

b) Ingestion of groundwater as drinking water. The text has it as a future scenario. As identified under comment #D-27, Table 2-6 states both current and future.

EPA Response (Tamara Langton, Dec. 2011): The change has been made in Table 2-6.

c) Under the Potential Trespasser receptor, Table 2-6 also has inhalation of vapors from soil to indoor air.

EPA Response (Tamara Langton, Dec. 2011): Table 2-6 no longer lists this for the trespasser scenario.

KTR Response (Revision 9, Oct. 2011): Table 2-6 and text have been adjusted to show consistency in receptor populations, ingestion of groundwater as a future exposure scenario, and trespassers inhalation of vapors from soil to outdoor air.

EPA Response (Tamara Langton, Dec. 2011): Re-check Table 2-6 against all text to ensure consistency.

- **#E-17, Page 14, HRIA and Breen, indoor commercial/industrial worker, 4th sub-bullet item (Marcia Bailey, 12/20/2011):** Delete this bullet item and change the third bullet item to "Ingestion and inhalation of and dermal contact with groundwater (future). The same comment applies to the bullet items under construction/utility worker (p. 14) and resident receptor (p. 15). Revise Table 2-6, if applicable.

- **#D-30, Section 2.2.3, Page 2-9, Summary of Potentially Complete Exposure Pathways, Downgradient Areas:**

- a) Table 2-6 only lists inhalation of vapors from groundwater to indoor air.
- b) Table 2-6 lists ingestion and dermal contact with groundwater as also a current scenario.

KTR Response (Revision 9, Oct. 2011): Table 2-6 has been adjusted to list inhalation of vapors in indoor and outdoor air, and to list ingestion and dermal contact with groundwater as a future scenario.

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

- **#D-31, Section 2.2.3, Page 2-9, Summary of Potentially Complete Exposure Pathways, Berwick Creek/Dillenbaugh Creek:** Table 2-6 only lists a child receptor.

KTR Response (Revision 9, Oct. 2011): Table 2-6 has been adjusted to show adult and child recreational receptors.

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

- **#E-18, Page 15, Berwick Creek/Dillenbaugh Creek (Marcia Bailey, 12/20/2011):** Use two bullet items instead of one, to indicate that incidental ingestion and contact with surface water or sediments is evaluated separately from fish consumption. Change the parenthetical language to "evaluated in Section 2.4.2, Uncertainties and Limitations."

Commented [TL9]: Now on top of page 15.

Commented [TL10]: Now on page 15.

SECTION 2.2.4 QUANTIFICATION OF EXPOSURE

- **#C-8, Section 2.2.4 Quantification of Exposure, Discussion of Groundwater:** The original comment was comment #13 from Marcia Bailey's 5/7/2009 memo on the January 2009 BRA.

Commented [TL11]: Now pages 15 -17.

Original Comment 13: I agree with Barbara Trejo's comment number 6 (her August 8, 2008 e-mail) in which she observed that the groundwater data for the HRIA and Breen properties were combined rather than evaluated separately for purposes of evaluating potential exposures. While EPA's November 3, 2008 responses addressed that specific issue, it seems that, at least for the Breen Property, the risk at the maximum PCE concentration in shallow groundwater of 2,400 ppb should be used for estimating risk, even if only as a comparison with the 95% UCL of 889 ppb. They both have uncertainties associated with them, but should be presented. For the HRIA, if the maximum is not considered to be located in a place where exposure is likely to occur, this should at least be described as the reason why the maximum value was not used for estimating risk.

KTR Response #1 (Version 6, July 2009): *Use of the 95% upper confidence limit on the mean is a standard practice for evaluating chronic exposures in human health and ecological risk assessments. It is unclear why use of maximum concentrations (even when sample sizes are sufficiently large, such as > 10, would be suggested only for these cases, but not throughout the BRA for all scenarios. In our opinion, starting to identify additional EPCs for selected exposure pathways and locations will complicate the BRA without adding any additional value. The groundwater exposure pathway via ingestion is already not truly a current pathway, as the municipal water supply is the drinking water source for these locations. Further, the cancer risks for PCE are already an order of magnitude higher than the acceptable level, so the approximately factor of two difference between the 95% UCL on the mean and the maximum concentration in groundwater is inconsequential. Finally, the groundwater EPC is not being used to estimate potential risks from inhalation, so the choice of the EPC has not influence on the air exposure pathway risk evaluation.*

EPA Response #1 (Marcia Bailey, 7/27/2009): I provided comments on this last week to the RPM, regarding the point Barbara Trejo brought up earlier regarding the combining of groundwater data for statistical purposes in assessing potential risk. I am not satisfied with the response here for the reasons I provided but suggest you seek Barbara's additional input. The primary issue is the appropriateness of combining data among different wells to generate a conservative estimate of central tendency for potential future drinking water risks, rather than evaluating wells independently, since exposure to well water for drinking water or other domestic purposes is typically on a single-well basis. Response to my comment #17 is related to this.

Input from Tamara: I have attached the 11/23/2008 EPA letter to Barbara Trejo responding to her comments on the issue of lumping groundwater data together

and calculating EPCs. See both Comment #5 and #6 in this letter. Although she didn't feel the need to comment further on the BRA, I will contact Barbara to get her reaction to this continuing issue (I will also touch base with Marcia before doing so).

What would be the cost and time factor to do what Marcia suggests in her comment on the January 2009 BRA (Comment #13) re: running maximum concentration calculations as she suggests for comparison purposes? If the end decision is not to do this for this BRA, it needs to be discussed in the BRA, perhaps under the Uncertainties and Limitations section.

KTR Response #2 (Version 7, April 2010):

a) We believe that the use of 95% UCLs for wells on the HRIA and Breen Property are appropriate for this site and are supported by EPA risk assessment guidance. However, if maximum concentrations for each chemical in each well were used, the estimated risks would increase. The biggest increase was the risk from PCE in the HRIA, where the exposure would increase from 85,893 µg/L to 2,720,000 µg/L for the 95% UCL and maximum concentration, respectively. This is reflected in an increase in the highest total non-cancer HQ from 84 to 2,664 and a total cancer risk of 1.62×10^{-1} to 5.13×10^0 . These changes do not change the results stated in the BRA, "Thus, current concentrations of VOCs (particularly PCE) have the potential to result in increased health risks to people drinking contaminated groundwater long term at the HRIA".

b) Since the residents would be exposed via single wells, those receptors were evaluated using data from single wells (described in Section 2.2.4.2). There were 16 instances (for 5 wells) where there were sufficient data to calculate a 95% UCL. These ranged from 28 to 71% of the corresponding maximum values. If the maximum measured concentration was used as the exposure estimate, the resulting total noncancer risk estimates would increase anywhere from <0.01 to 26. The maximum increase is from PCE in Well PW-9, where the total noncancer risk estimate would increase from 18 (using the 95% UCL) to 45 (using the maximum value). The total cancer risk estimates would increase between 7.51×10^5 to 2.86×10^2 . This does not change the conclusion that, depending on the well and given current groundwater concentrations, there may be risks to future residents living downgradient of the Breen Property and the HRIA if they were to use groundwater as their water source rather than the municipal water supply.

c) Added additional bulleted text in Section 2.4.2 Uncertainties and Limitations describing the results using 95% UCLs versus maximum measured concentrations:

"Groundwater exposure concentration estimates. For exposure to COPCs in groundwater from wells, the 95% UCL was used, if there were sufficient data, since this represents a reasonable exposure over time. If maximum concentrations were used as exposure concentrations, the resulting risk estimates from cancer and noncancer endpoints would

increase. However, these increases do not change any of the results from the current analysis. The largest difference would be in evaluating PCE concentrations in HRIA wells, from a 95% UCL of 85,893 µg/L to a maximum of 2,720,000 µg/L. The resulting total noncancer and cancer estimates for the HRIA site would increase from 84 to 2,664 and a total cancer risk of 1.62×10^{-1} to 5.13×10^0 , respectively. Changing these exposure concentrations would not change the stated results for onsite or offsite exposure to groundwater, which is that current concentrations of VOCs have the potential to result in increased health risks to people drinking contaminated groundwater long term at the HRIA and at offsite residences.”

EPA Response #2 (Marcia Bailey, 5/6/2010): Changes are needed to address this comment regarding section 2.2.4 (Quantification of Exposure) in the BRA:

a) 95% UCLs are definitely acceptable for individual wells. EPA was not suggesting otherwise in Comment 8, i.e., use of maximum values, although where the number of sampling events for a specific well is small, it is theoretically possible for the 95% UCL to actually exceed the maximum detected value, when there is significant variability among results in a small population of sampling results. However, the discussion in the Parametrix response does not seem to get to Barbara Trejo’s point, which is that ground water concentrations from multiple wells should NOT be combined to derive a statistic for estimating exposure. Specifically, it is not clear whether the increases cited in the response that address 95% UCLs versus maximum values are based on individual or combined well concentrations in the HRIA and Breen Property. EPA requires clarification on this, particularly since the language in the first paragraph of 2.2.4.1 states “evaluation of data from individual wells or use of maximum concentrations would unnecessarily result in overly conservative exposure estimates.” This seems to be contrary to the response in the second bullet of item 8 in the response document that states “[s]ince the residents would be exposed via single wells, those receptors were evaluated using data from single wells (described in Section 2.2.4.2).” The rationale for using data from individual wells to estimate exposure should be applied consistently, even if the Breen and HRIA properties are commercial.

In summary, EPCs for groundwater should be based on individual wells, within which 95% UCLs are fine to use. If the 95% UCL exceeds the maximum detected value, the maximum may be used, but that should be noted as an uncertainty, since additional data would resolve the question as to which is closer to a central tendency value over time.

b) Third bullet item: This refers to new language in the second bullet item of section 2.4.2, including this sentence: “[f]or exposure to COPCs in groundwater derived from wells, the 95% UCL was used if there were sufficient data...” This should clarify that all exposures to groundwater estimated from well water data are based on individual, not combined, wells. All of the new information beyond the first sentence in the second bullet item of section 2.4.2 is unnecessary.

KTR Response #3 (Revision 9, Oct. 2011):

a) To determine the EPC for each COPC to be used in assessing the HRIA and Breen properties, the 95% UCL of the concentrations for the group of wells identified by EPA for each area, as listed on Table 2-1, was calculated as follows: The total number of groundwater data points for each COPC ranged from 10 to 362. The number of data points per well for each COPC ranged between 4 and 9, but were typically between 13 and 19. If the COPC in that well had 10 or more data points, an average concentration was calculated for that COPC in that well using data reported as detected, thus providing a single value by COPC and by well for use in EPC calculations. If a COPC in a well had fewer than 10 data points, the maximum detected value was used for that COPC in that well. If no detections were reported for a COPC in a specific well, the highest detection for that COPC was used. Estimated 95% UCLs for each area are presented in Table 207a. In all cases, ProUCL was used to calculate averages and UCLs, and the methodology followed that recommended by the program.

EPCs for downgradient areas were determined on a well by well basis as follows: For each groundwater well, all available data (i.e., all depths) were utilized to calculate a 95% UCL. This approach was thought reasonable because a drinking water well could easily be screened across a large interval that would include both shallow and deeper groundwater. Numerous groundwater well data sets consisted of less than 10 samples; in these cases maximum measured concentrations were used as the EPC. Estimated 95% UCLs for each downgradient groundwater well are presented in Table 2-7b

b) The language has been adjusted to describe the approach used for estimating groundwater EPCs. See response to comment 8a above.

EPA Response #3 (All, Dec. 2011): See comment #A-3 and others regarding grouping of wells.

- **#E-19, Page 15, Section 2.2.4 (Marcia Knadle, 12/20/11):** There needs to be a group GW EPC (and a soil EPC?) developed for the Thurman Berwick Creek area (TBCA), along with the ones for the HRIA and Breen areas. It also needs to be specified that all the EPCs have been developed for the shallow aquifer only (deep aquifer wells must be excluded). There's no risk assessment related to the deep aquifer because we've never seen significant detections in any of those wells. Addition of the TBCA scenario will likely have ripple effects throughout the document.

There should also be some discussion of the decision to include GW data from borings in the EPCs. This is not standard risk assessment methodology. I would say that the reasons include 1) the fact that a preponderance of the spatially available data (both areally and vertically) within the shallow aquifer is from borings, and 2) that a review of local logs for domestic wells shows that it's not unusual for

them to be finished with no screen, just an open end at the bottom of the casing, so the short screen intervals typically sampled in temporary borings are not overly conservative. The monitoring wells, on the other hand, tend to have longer screens than the typical domestic well and may underestimate potential exposure. (This may explain why PW-9 is more contaminated than nearby MWs would suggest it should be – it may be an open-end well that happens to pull from an unusually “hot” zone.) Overall, the available MW and boring GW concentration data appear to be generally consistent.

- **#E-20, Page 15, Section 2.2.4.1, EPCs for HRIA and Breen Property (Marcia Knadle, 12/20/2011):** For the sake of transparency, there needs to be a clearer presentation of the logic behind developing the GW EPCs: that in the 3 presumed source areas (all in areas served by public water and zoned commercial/light industrial) the EPCs for the future worker scenarios are based on worst-case groupings of wells and borings. I recommend adding a figure (or figures) showing the Option 1 areas (see my 10/23/10 email) and referencing it in Section 2.2.4.1. I'm also attaching a figure for the Breen area that shows the 2 competing worst-case GW areas.
- **#E-21, Page 16, Section 2.2.4.1, EPCs for HRIA and Breen Property, 4th & 5th paragraphs, construction or utility workers and the trenching scenario (Marcia Bailey, 12/20/2011):** This exposure scenario should include the Breen Building B area where there is vinyl chloride in shallow groundwater.
- **#E-22, Pages 16 & 17, Section 2.2.4.1, EPCs for HRIA and Breen Property (Julius Nwosu, 10/12/2011):** Marcia Knadle, the EPA Hydro for the site thinks that the average trench depth to water table set at 5 feet for the HRIA is incorrect because the groundwater level in the area has seasonal variation, and using one value will be inappropriate. Therefore, she thinks we should use a tiered approach: Winter/Spring level should be set at 3 feet; and Summer/Fall should be set at 5 feet.
- **#E-23, Page 17, Section 2.2.4.2, EPCs for Downgradient Areas (Marcia Knadle, 12/20/2011):** It should be clarified that the Downgradient Area is the area of the plume downgradient of Labree Road (and all the known or suspected source areas), and that both wells (PS and MW) and borings are evaluated individually.

SECTION 2.2.5 RECEPTOR INTAKE ASSUMPTIONS

- **#E-24, Page 18, Bullets (Marcia Bailey, 12/20/2011):** If any of the listed guidances were not specifically used for the BRA, please delete them. RAGS Part F should be added to the list, as it informs all EPA inhalation algorithms.

SECTION 2.2.6 DOSE ESTIMATION

- **#C-9, Section 2.2.7 Dose Estimation:** The original comment was Marcia Bailey's comment # 21 from her 5/7/2009 memo on the January 2009 BRA:

Commented [TL12]: Now is Section 2.2.6 starting on page 18.

Original Comment 21: According to footnotes to Tables 2-9a and 2-9b, subchronic values used in this BRA were derived by multiplying chronic values by 10. Chronic values should be used unless subchronic values can be derived and justified on chemical-specific bases.

The following is from RAGS Part F: Step 2 of the recommended process for estimating an [exposure concentration] for use in a hazard quotient involves assessing the exposure pattern for each exposure scenario at a site. This entails comparing the exposure time and frequency at a site to that of a typical subchronic or chronic toxicity test.²⁸ Exposure regimens vary from study to study. Risk assessors should use best professional judgment to determine if the exposure pattern in a given scenario is reasonably similar to a typical regimen for a subchronic or chronic study.

KTR Response #1 (Version 6, July 2009): *As noted, subchronic daily intakes were assumed for construction worker and child recreation scenarios. Of these scenarios, the only HQs greater than 0.1 are 6.7 and 0.9 for PCE and TCE, respectively, based on ingestion of groundwater at the HRIA. The PCE RfD includes an uncertainty factor of 10 for extrapolation of a subchronic effect level to a chronic effect level, so multiplication of the RfD by 10 brings the value back to a subchronic value. There are obviously substantial uncertainties in relating the sensitivity of test mammals, such as rats, to humans and hence, the use of various uncertainty factors in deriving RfDs. There is additional uncertainty in determining which exposure regime for a test organism is representative of a "subchronic" exposure by a worker at the site. Overall, in our opinion, the most straightforward approach is to simply assume that a chronic toxicity threshold is an order of magnitude more sensitive than a subchronic toxicity threshold, which is the same default factor used to derive RfDs.*

EPA Response #1 (Marcia Bailey, 7/27/2009): Subchronic values may be used on a chemical- and exposure pathway-specific basis. Parametrix has provided this information for the oral RfD for PCE only. Since inhalation is also an exposure that must be considered for direct contact with groundwater, the derivation of the inhalation RfC or RfD needs also to be evaluated to determine whether a subchronic value can be appropriately derived from the background information for the chronic toxicity value. ATSDR intermediate values also may be used for subchronic values if they are not readily available from IRIS or PPRTVs. However, all of the subchronic values in Tables 2-9a and 2-b must be justified individually, or else chronic values used. [Note: if Parametrix provides justification for using a subchronic value for inhalation of PCE, as it has for ingestion of PCE, then subchronic values could be used for this chemical for exposure to groundwater as drinking water/domestic use.]

KTR Response #2 (Revision 7, April 2010): *Other sources were investigated for subchronic values. The only value found, besides the oral RfD for PCE, was an inhalation intermediate MRL for inhalation and oral exposures for cis-1,2-dichloroethene from ATSDR (1996). For the other COPCs, chronic values were used for the construction worker and child recreation scenarios. This did not change the risk results.*

EPA Response #2 (Marcia Bailey, 5/6/2010): The response is acceptable.

- **#E-25, Page 18, Section 2.2.6, Dose Estimation, second sentence (Marcia Bailey, 12/20/2011):** Only RAGS Part A is referenced for dose equations. Some RAGS A equations pertinent to the BRA have been updated by RAGS Parts B, E and F. All of these should be cited (and used).
- **#E-26, Page 19, Section 2.2.6, equation for estimating intake from soil, water and air (Marcia Bailey, 12/20/2011):**
 - a) There is no body weight or intake rate used for EPA inhalation exposures (see RAGS Part F and RSL equations), so a separate equation is needed for inhalation intake.
 - b) EPA does not calculate dermal contact with soil for VOCs (see RAGS Part E and RSL equations), unless Exhibit 3-4 in RAGS Part E or a justifiable independent source provides a dermal absorption value (ABS). (For Exhibit 3-4, this includes only a few PCBs and PAHs). Therefore, soil and water need separate equations and an explanation regarding VOCs. (Note: The summary media tables (2-3 through 2-5) indicate that all Site-related COPCs are VOCs. Tetrahydrofuran (Table 2-3 – groundwater only) may be an exception, but it has no EPA-recognized screening or other toxicity value at this time. One is expected on IRIS in 2012. It would be acceptable to include an equation for non-VOCs as well as VOCs in groundwater in order to not have to include the SVOC equation later for tetrahydrofuran. In any case, an equation for Site VOCs in soil is needed that does not include dermal contact, since none of the Site VOCs is included in RAGS E Exhibit 3-4, and furthermore, there does not appear to be any information in the BRA as to what ABS values were actually used.

c) As indicated above, inhalation must be included in the groundwater equations for VOCs, for future potential use as a drinking water source.

- **#C-17, Section 2.2.6, Dose Estimation:** The original comment was a comment from Julius Nwosu on his 8/8/2009 memo regarding the July 2009 BRA: “The methodology applied in estimating chemical intakes for the ingestion and dermal was very confusing, particularly for the dermal pathway for contaminants in water. EPA RAGS Part E (Dermal Guidance) outlines how dermal absorbed doses for contaminants should be computed for both soil and water. The equations presented in the BRA for the derivation of the dermal absorbed dose per event (DA_{event}) for water and dermal absorbed dose (DAD) was not clear. Dermal absorbed dose per event is not the same as the dermal absorbed dose (DAD). It was unclear what parameter was incorporated into the equation to estimate risk from this pathway for contaminants in water. In addition, Table 2-8c did not indicate what values were used for dermal absorbed dose per event to estimate the chronic dermal dose (DAD). See below how these two variables defer:

Commented [TL13]: Now on pages 19 & 20.

Dermal Absorbed Dose – Water Contact

$$DAD = \frac{DA_{event} \times EV \times ED \times EF \times SA}{BW \times AT}$$

Where:

DAD = Dermal Absorbed Dose (mg/kg-day)

DA_{event} = Absorbed dose per event (mg/cm²-event)

SA = Skin surface area (cm²)

EV = Event frequency (events/day)

EF = Exposure frequency (days/year)

ED = Exposure duration (years)

BW = Body weight (kg) 70 kg (adult) 15 kg (child)

AT = Averaging time (days) noncarcinogenic effects AT = ED x 365 d/yr
carcinogenic effects AT = 70 yr x 365 d/yr

Dermal Absorbed Dose per event for Organic Compounds – Water Contact

$$DA_{event} = K_p \times C_w \times t_{event}$$

Where:

K_p = Dermal permeability coefficient (cm/hr)

C_w = Chemical concentration in water (mg/cm³)

t_{event} = Event duration (hr/event)

Input from Tamara: Please see related Marcia Bailey comments and response to

comments #20 and #21 on the January 2009 BRA.

KTR Response #1 (Revision 7, April 2010):

- Please note that the equations provided above for DA_{event} are for inorganic compounds, the correct equations were used in this report (from EPA 2004)
- The DA parameter provided in the text is the DA_{event} in the equations provided above.
- The Dermal Absorbed Dose equation provided above is consistent with EPA RAGs Part E. The equation provided in Section 2.2.6 is the same equation, except that two of the factors have been combined. The EV and EF parameters from the DAD equation above were simplified into one EF parameter that assumed 1 event per day, and 350 events per year. This explanation was added to the text of Section 2.2.6.

EPA Response #1 (Julius Nwosu, 4/30/2010): To improve transparency, Parametrix needs to do the following:

- a) Break out EF and EV into separate rows in Table 2-8a
- b) Add a new column to Table 2-8c which lists the DAD result.

EPA Response #2 (Marcia Bailey, 5/6/2010): The response appears adequate to me, but I believe Julius, who originated the comment, does not agree.

KTR Response #2 (Revision 9, Oct. 2011): The EV parameter does need clarification, however, this parameter is not presented in the equations in Table 2-8a and may be confusing if added at this location. The relevant equation is shown in Table 2-8c and EV is displayed on Table 2-8c, Column G. The column headings have been edited to make the parameter more evident. Table 2-8c, Column C presents DAD results.

EPA Response #3 (Julius Nwosu, 12/22/2011): The response is acceptable.

- **#E-27, Page 20, Section 2.2.6 (Marcia Bailey, 12/20/2011):** Also needed are equations for inhalation of contaminants in vapors (indoors, outdoors, trench); incidental ingestion of and contact with surface water; and fish consumption.

CURRENT SECTION 2.3 TOXICITY ASSESSMENT

Commented [TL14]: Now on pages 20 – 21 and very much re-written.

- **Comment #C-10, TCE Toxicity Values Memo from Region 10:** The original comment (Comment #24) was from Marcia Bailey's memo dated 5/7/2009 regarding the January BRA.

Original Comment 24, Page 2-13, section 2.3, Toxicity Assessment, second paragraph: The third sentence should be amended to include the fact that oral cancer slope factors are also used to assess dermal risks in the absence of dermal-specific slope factors. The last sentence, regarding the use of route-to-route extrapolation for inhalation evaluation, should be deleted, pursuant to RAGS Part F that is specific to inhalation (see Comment #20 from 5/7/2009 memo). Route-to-route extrapolation should not be used in this baseline risk assessment, with the exception of TCE, where the 2001 EPA external review draft TCE health risk assessment found cancer risks from the two routes of exposure to be comparable. See the enclosed letter from Mike Cox to Martha Hankins regarding Region 10/OEA recommended TCE toxicity factors.

KTR Response #1 (Version 6, July 2009): *See response to comment #23 from 5/7/2009 memo below: In addition, no route-to-route extrapolation was actually used to derive inhalation RfDs and slope factors, so this sentence was deleted in the paragraph.*

(Marcia's comment #23 was about Page 2-13, section 2.3, Toxicity Assessment, first paragraph, third sentence: This sentence should be revised to read: "Reference doses (RfDs) are used to quantify oral noncancer health effects, reference concentrations (RfCs) are used for inhalation noncancer health effects, cancer slope factors (CSFs) are used to quantify oral cancer risks." Toxicity factors used in this baseline risk assessment should be corrected, accordingly (E.g., Table 2-9d)).

The KTR responded with: The suggested edit to the sentence was slightly revised based on e-mail exchanges between David DeForest, Marcia Bailey, and Tamara Langton on June 18-19. It was agreed that the inhalation risk estimates would not be updated based on 2009 guidance to use the unit risk approach. Accordingly, the sentence was revised as follows: "Oral and inhalation reference doses (RfDs) are used to quantify noncancer health effects and oral and inhalation cancer slope factors (CSFs) are used to quantify cancer risks." The following footnote was added to this sentence: "Note that recent EPA guidance for inhalation risk assessment (EPA 2009) no longer supports the use of inhalation RfDs and inhalation slope factors, but rather reference concentrations (RfCs) and inhalation unit risks. The BRAS was not updated to reflect this recent change in inhalation risk assessment guidance, but it should be noted that the inhalation RfD and inhalation slope factor approach provides more conservative risk estimates."

EPA Response #1 (Marcia Bailey, 7/27/2009): In addition, it does not appear that my comment #24 from my May 7, 2009 memo to you regarding Region 10's

toxicity values for TCE was incorporated. This is elaborated on below, for that comment, but specific to this issue, there is no current EPA TCE oral noncancer toxicity currently available; and the interim (chronic) inhalation reference concentration used and recommended by EPA is 10 ug/m3, based on the evaluation by NYSDOH.

Input from Tamara: I have attached this memo to this letter.

KTR Response #2 (Revision 7, April 2010):

- *Changed inhalation RfC from 0.04 to 0.01 in Table 2-9b. This changed the noncancer results on Table 2-10a. There are still no HQ values > 1.*
- *Oral RfD for TCE of 0.0003 mg/kg-day removed from Table 2-9a. Additional description provided in uncertainty section 2.4.2 that there currently is no reliable TCE oral noncancer toxicity value, therefore we may be underestimating non-cancer risk from TCE.*

EPA Response #2 (Marcia Bailey, 5/6/2010): The response is acceptable.

- **Comment #C-11, Section 2.3 Toxicity Assessment:** The original comment was Comment #24 from Marcia Bailey's 5/7/2009 memo regarding the January 2009 BRA which is outlined above under EPA Comment #10.

Commented [TL15]: Now pages 20 – 21.

KTR Response #1 (Revision 7, July 2009): See response to Comment #23 above. In addition, no route-to-route extrapolation was actually used to derive inhalation RfDs and slope factors, so this sentence was deleted in the paragraph.

EPA Response #1 (Marcia Bailey, 7/27/2009): The response does not address the issue of TCE toxicity values recommended for EPA Region 10 and the states within Region 10, as expressed in the October 2008 letter from Mike Cox (EPA Region 10) to Martha Hankins (Ecology) that was attached to my comments of May 2009 on the previous version of the BRA. This is an instance where relatively new Region 10 policy needs to be incorporated into the Hamilton/LaBree BRA, as this is an issue of importance and consistency, with our states and with our communications with the Department of Defense.

The following is from a September 22, 2008 memo from Joyce Kelly, OEA Director to Dan Opalski, ECL Director, Region 10, and reflects our current recommendations (and is consistent with the October letter from Mike Cox to Martha Hankins):

In summary, OEA recommends the following to ECL as interim TCE values.

For cancer oral and inhalation assessments:

1a) Use of the geometric mid-point of the slope factor range from EPA 2001 (0.089 per mg/kg-day) for evaluating cancer risks for both inhalation and oral exposures. Using standard Superfund exposure assumptions for residential settings and a 1E-6 excess cancer risk level,

this value would result in an acceptable TCE air concentration of 0.10 $\mu\text{g}/\text{m}^3$ and an acceptable soil concentration (considering ingestion and inhalation) of 0.23 mg/kg ;

or

1b) Use of the CalEPA oral slope factor (0.013 $\text{mg}/\text{kg}\cdot\text{day}$) and the CalEPA inhalation unit risk ($2\text{E}-6$ per $\mu\text{g}/\text{m}^3$), adjusting each value upward by a factor of 10 (0.13 $\text{mg}/\text{kg}\cdot\text{day}$ and $2\text{E}-5$ per $\mu\text{g}/\text{m}^3$). Using standard Superfund exposure assumptions for residential settings and a $1\text{E}-6$ excess cancer risk level, these adjusted values would result in an acceptable TCE air concentration of 0.12 $\mu\text{g}/\text{m}^3$ and an acceptable soil concentration (considering ingestion and inhalation) of 0.28 mg/kg ;

and

For noncancer inhalation assessments:

2) Use of an inhalation reference concentration of 10 $\mu\text{g}/\text{m}^3$, based on the analysis by NYDOH. This means that a concentration of 10 $\mu\text{g}/\text{m}^3$ TCE in air represents a hazard quotient of 1.0.

We provide use of adjusted CalEPA cancer values for DoD sites; for Hamilton LaBree, we recommend the use of option #1 above, which is consistent with what the Department of Ecology uses. There is little difference between the results using one or the other. The BRA needs to incorporate these TCE toxicity values, and no oral noncancer value should be used for EPA-based calculations. [Note: You may want to consult with Tim Brincefield on this, as last week he consulted with me regarding a situation for the Well 10A (Time Oil) ROD, for which Ecology says Method B is an ARAR, including the use of the oral noncancer TCE value on CLARC, which is a withdrawn EPA/IRIS value of 0.0003 $\text{mg}/\text{kg}\cdot\text{day}$, no longer recognized by EPA under our toxicity hierarchy. This had not been resolved when I left, but it may not be of comparable significance for the eventual ROD for Hamilton/LaBree since TCE is not the primary risk driver.] In any case, the noncancer equations for direct contact with groundwater containing TCE in this BRA should not include dermal or ingestion toxicity values but should include inhalation based on NYSDOH. The reference concentration of 10 $\mu\text{g}/\text{m}^3$ from NYSDOH, representing a hazard quotient of 1.0, may be converted to an inhalation reference concentration for purposes of the calculations in this BRA. These recommendations will stand until EPA ORD's new TCE health risk assessment is available publicly. The reference for the NYSDOH document is in the letter from Mike Cox to Martha Hankins provided earlier (I don't have it with me and am not online).

KTR Response #2 (Revision 7, April 2010): Based on the comments provided, for cancer oral and inhalation assessments, we will use TCE toxicity values from summary bullet 1a above. This is the most conservative value, and is based on an evaluation by USEPA (noting that this is from a draft document). Since the range of slope factors from Table 4-9 of EPA 2001b is not normally distributed, we determined the geometric mean is the appropriate statistic of central tendency of the dataset, as suggested by the referenced memo. The geometric

midpoint of the range of applicable cancer slope factors (0.02 to 0.4 per mg/kg-d) is calculated as 0.089 per mg/kg-d and will be used for both the oral and inhalation assessments.

- This was updated on Tables 2-9 c and 2-9 d.
- The Cancer risk calculations changed on Tables 2-10a, 2-10b, 2-10d, and 2-10f

From this comment and comment #10, the oral and dermal RfD for TCE of 0.0003 mg/kg-day was removed from Table 2-9a. Additional description provided in uncertainty section 2.4.2 that there currently is no reliable TCE oral noncancer toxicity value, therefore we may be underestimating non-cancer risk from TCE.

EPA Response #2 (Marcia Bailey, 5/6/2010): The response is acceptable, with the exception of referring to the lack of "reliable" oral (and therefore dermal) toxicity values. All references to this within the BRA should be described to this effect: "There currently are no oral [or dermal, where appropriate] toxicity values for TCE that meet the criteria for Tier I, II or III sources for Superfund sites as described in OSWER Directive 9285.7-53, dated December 5, 2003. [See <http://www.epa.gov/oswer/riskassessment/pdf/hhmemo.pdf>.]

KTR Response #3 (Revision 9, Oct. 2011): The recommended change has been made to the text.

EPA Response #3 (Tamara Langton, Dec. 2011): Revise text and or tables where applicable in light of recent changes regarding TCE and methylene chloride.

- **#E-28, Page 21, Section 2.3, Toxicity Assessment, bullet items (Marcia Bailey, 12/20/2011):** The formal hierarchy for Superfund toxicity criteria is found in EPA OSWER Directive 928.7-53 [<http://www.epa.gov/oswer/riskassessment/pdf/hhmemo.pdf>] and should be used here instead of the hierarchy presented. An acceptable alternative is to cite IRIS and the RSL tables, because the RSLs follow the OSWER Directive hierarchy, but sometimes there are updates of IRIS before RSLs are updated (normally twice per year). Methylene chloride (dichloromethane) and tetrachloroethylene are examples that are applicable to this Site (assuming tetrachloroethylene values will be posted to IRIS prior to the next RSL update in May 2012).

SECTION 2.4 RISK CHARACTERIZATION/

Commented [TL16]: Now pages 21 – 30.

- **Comment #C-18, Section 2.4, Risk Characterization:** The original comment was from Julius' 8/8/2009 memo on the July 2009 BRA regarding page 2-15: "The narrative presented for vinyl chloride carcinogenicity, particularly the mutagenic mode of action for ingestion and dermal was not clear. The equations presented did not show explicitly how cancer risks for the two pathways were derived. In addition, there was no Table presented in the Appendix to illustrate what toxicity values (i.e., RfD and oral slope factor) were applied, and the resultant dermal absorbed doses. Thus, risk characterization for all VOCs evaluated for ingestion and dermal for the site should include all the input parameters and their corresponding derived chronic ingestion and dermal absorbed doses."

Commented [TL17]: Now page 22.

KTR Response #1 (Revision 7, April 2010):

- *The current text states the tables where the parameters used in the equations are located. The results are presented as part of Table 2-10f. Discussion was added as part of Section 2.4.1.3, in the groundwater exposure section.*

EPA Response #1 (Julius Nwosu, 4/30/2010): The explanation on the process used in the evaluation of vinyl chloride mutagenic mode of action for ingestion and dermal was improved somewhat, except it still did not describe how cancer risks for the two pathways were calculated. Contrary to what was stated in the text (pages 2-5 & 2-16), the groundwater dermal risk equation did not show the age aggregates (Age bins) in the assessment from early childhood to adulthood (6 to 30 years). The equations should at a minimum include all the parameters mentioned in Table 2.8A.

EPA Response #2 (Marcia Bailey, 5/6/2010): The response appears adequate to me. The comment was provided by Julius.

EPA Response #3 (Marcia Bailey, 6/3/2010): Delete the discussion in the last paragraph on page 2-15 starting with the sentence beginning "Background information..." Substitute this with a discussion of Ecology's policy on using the IRIS oral cancer slope factors for continuous lifetime exposure during adulthood and continuous lifetime exposure from birth, as provided in CLARC (<https://fortress.wa.gov/ecy/clarc/FocusSheets/VinylChloride.pdf>), (The information from CLARC may be used verbatim, as appropriate.) Note that the latter is used unless children and pregnant women are not potentially exposed. Given this, the cancer potency factor of 1.5 per mg/kg-d should be used in Table 2-9c and in all equations for estimating oral (and dermal) risks from exposure to VC at this site.

KTR Response #2 (Revision 9, Oct. 2011): *A discussion of the MTCA policy has been substituted and the potency factor changed to a value of 1.5 per mg/kg-d.*

EPA Response #2 (Tamara Langton, Dec. 2011): The response is acceptable.

• **#E-29, Page 22, beginning after the bullet items (Marcia Bailey, 12/20/2011):**

The language should be changed to this effect: "In assessing cancer risk, some chemicals are given special consideration because they are carcinogenic via a mutagenic mode of action. Chemicals that are carcinogenic via a mutagenic mode of action can cause irreversible changes in DNA, and when exposure occurs during early life (before 16 years of age), this may be manifested as a higher lifetime risk of cancer than when exposure occurs later in life only. Vinyl chloride and TCE are Site-related COPCs and have been determined by EPA to be carcinogenic via a mutagenic mode of action. Information in IRIS and in the RSL equations provide information as to how to account for vinyl chloride and TCE cancer potency for early-life exposure, consistent with information in IRIS and in the EPA *Supplemental Guidance for Assessing Cancer Susceptibility from Early-Life Exposure to Carcinogens* (USEPA, 2005) [<http://www.epa.gov/cancerguidelines/guidelines-carcinogen-supplement.htm>].

Vinyl chloride has chemical-specific information to aid in the evaluation of early-life exposure, while TCE does not. Age-dependent adjustment factors must be applied to TCE's kidney cancer potency, which is the only one of the TCE cancer outcomes that was found to be carcinogenic via a mutagenic mode of action. [Note: it would be acceptable to present the equations for TCE here.] For vinyl chloride, this BRA uses the recommendations in Ecology's CLARC database [<https://fortress.wa.gov/ecy/clarc/FocusSheets/VinylChloride.pdf>], which provides for the use of the higher of the two cancer potency factors (i.e., lifetime including early life) for oral, dermal and inhalation exposures, because it is assumed that the early-life exposure includes fetal exposure. Therefore, the oral slope factor of 1.5 per mg/kg-d and the air unit risk of $8.8E-4$ per ug/m³ are used in this BRA for all exposures because there is no assurance that no pregnant women or children could be exposed.

If the above description does not hold for what was done in the BRA for EPA Superfund evaluations of vinyl chloride, then this section needs to be revised to make it clear that the description for Ecology's policy on vinyl chloride was used only for MTCA equations. The text implies that the Ecology method was used throughout. If the EPA early-life methodology was used for EPA estimations of exposure and risk, the RSL equations (which consider less than lifetime exposure, as opposed to the IRIS toxicological assessment which considers lifetime exposure) should be rearranged for risk calculations and presented here, with an explanation that both EPA and Ecology methods have been included in the BRA. In any case, the manner in which exposure to vinyl chloride was evaluated for cancer risk must be transparent.

Include this additional language as well:

Vinyl chloride has been evaluated in this BRA only for contact with contact with groundwater, as it has not been detected in other measured media. Risk estimates associated with groundwater are for potential future exposures only, since currently all residences are connected to a municipal water supply. For the

noncancer effects of TCE, a primary adverse outcome is fetal cardiac deformities, following exposure in utero. Therefore, the noncancer and dermal concentrations in media that represent a hazard quotient of 1 is considered to be not-to-be-exceeded concentrations, and the inhalation reference concentration of 2 ug/m3 is also considered a not-to-be exceeded concentration for all exposure scenarios.

[Note: changes in various tables and in risk calculations, including text as appropriate, will need to be made to reflect the changes due to the above directions]

- **#D-32, Section 2.4.1, Presentation of Risk Results, Pages 2-16 thru 2-18, Sections 2.4.1.1 and 2.4.1.2:** As with earlier comments, the receptor names and whether the scenarios are for the present or future do not all agree with Table 2-6. These need to be consistent in the text and in the table(s).

Commented [TL18]: Now pages 23 – 25.

KTR Response (Revision 9, Oct. 2011): The text and tables have been edited for consistency.

EPA Response (Tamara Langton, Dec. 2011): Check text and Table 2-6.

- **#E-30, Pages 24-25, Section 2.4.1.2, Breen Property (Marcia Knadle, 12/20/2011):** In this discussion, it needs to be clarified that the GW component of the future worker risk scenario assumes exposure from a well in a worst-case area – either near Building C or near Building B, whichever turns out to be worse – that may supply water to workers anywhere on the Breen property. Either way, the discussion should mention the area with the lesser risk by explaining that there's more than one area on the Breen property where risk related to GW exposure is high. Finally, there likely needs to be a Building B area trench scenario evaluation, since the vinyl chloride is high in the shallow zone.

- **Comment #C-1, Pages 2-17 and 2-19, Potential Trespasser:** The original comment on the Potential Trespasser was Comment #14 by Marcia Bailey in her 5/7/2009 comments on the January BRA:

Commented [TL19]: See Current Sections 2.4.1.1 (HRIA, Trespasser, Page 24) and 2.4.1.2 (Breen Property, Page 25).

Original Comment #14, Page 2-8, Discussion of Soil: The contractor states: "Residential or recreational receptors are not expected to frequently visit these locations; therefore, neither the HRIA nor the Breen Property soil exposure was considered a complete pathway for residential/creational receptors." Marcia's comment was: "Unless institutional controls are in place to ensure that future contact with these soils will be restricted to commercial workers, the potential future resident and potential current and future trespasser should be included in the conceptual site model."

Commented [TL20]: See Current Section 2.2.3, Exposed Populations and Exposure Pathways, Soil, Page 13.

KTR Response #1 (Revision 6, July 2009): Rather than include a quantitative analysis of potential trespasser exposures at the HRIA or on the Breen Property, we propose to simply qualitatively discuss that potential risks to trespassers on these

properties would be less than those estimate for workers on the these sites, who have a much higher exposure frequency and duration than any potential trespassers. Since soil ingestion and ambient air inhalation risks were not of concern for workers at these sites, we can say that potential risks to any trespassers would be even lower. Paragraphs were added to Sections 2.4.1.1 and 2.4.12 discussion that cancer risks to construction workers at the HRIA and Breen Property are not of concern and, therefore, potential risks to a trespasser are also below levels of concern because exposures would be lower.

EPA Response #1 (Tamara Langton, January 2010): This is the first time that this receptor is mentioned in the report, and its sudden appearance is rather clunky. Shouldn't this be mentioned earlier in the report when first discussing potential exposure populations and pathways? And then take it on its next logical step(s), as short as this journey may be? It should also be explained why the decision was made to not include a quantitative analysis as stated in the above response.

KTR Response #2 (Revision 7, April 2010):

- Added receptor to Section 2.2.3 in the introduction paragraph, in the section for soil exposure, and in the summary bullets.
- Added receptor to Table 2-6
- Clarified Trespasser text in Sections 2.4.1.1 and 2.4.1.2 regarding the use of construction workers as a surrogate for screening potential risks to trespassers, since the exposure duration of potential trespassers would most likely be less frequent than 20, eight-hr days in a year
- Added to summary bullets and text in Section 4

EPA Response #2 (Marcia Bailey 5/6/2010, Review of Version 7): The addition of the trespasser receptor to the various sections and Table 2-6 is appropriate. On page 2-8, the new description of the trespasser exposed to soil should be clarified by adding "outdoor" prior to "vapor inhalation," since both outdoor and indoor vapor inhalation are discussed in the paragraph. While trespassers are typically understood to be outdoor-only, it's possible that there could be some confusion here.

KTR Response #3 (Revision 9, Oct. 2011): On page 2-8, the description of the trespasser exposed to soil has been clarified by adding "outdoor" prior to "vapor inhalation."

EPA Response #3 (Tamara Langton, Dec. 2011): Revision 9 does not have a page 2-8. The appropriate page in revision 9 dealing with the last response appears to be page 13, Section 2.2.3. The response and changes are acceptable.

- **#D-33, Section 2.4.1.2, Presentation of Risk Results - Breen Property, Page 2-17, second full paragraph, second sentence:** Earlier in the text you have stated that a risk analyses for current exposure to drinking contaminated groundwater was not conducted in this BRA. And yet this sentence seems to imply that one was conducted. Did you mean to say that there is potential for increased health risks to

Commented [TL21]: Now page 25.

people if they drink contaminated groundwater in the future if the current concentrations of VOCs persist in groundwater at the HRIA?

KTR Response (Revision 9, Oct. 2011): *Text and tables have been edited to describe exposure to drinking groundwater as a future use scenario and to indicate that people who drink contaminated groundwater would be subject to increased health risks if current concentrations of VOCs persist in groundwater at the HRIA.*

EPA Response (Tamara Langton, Dec. 2011): Page 25, 2nd paragraph. Last sentence has this clearer language. The response is acceptable.

- **#D-34, Sections 2.4.1.1 and 2.4.1.2, Presentation of Risk Results – HRIA and Breen Property, Pages 2-17 thru 2-18, HRIA and Breen Potential Trespasser:** Delete the last sentence. Replace with "For a potential trespasser excess individual lifetime cancer risks due to exposures to outdoor air and soil are estimated to be lower than 1×10^{-6} ."

Commented [TL22]: See Current Sections 2.4.1.1 (HRIA, Trespasser, Page 24) and 2.4.1.2 (Breen Property, Trespasser, Page 25).

KTR Response (Revision 9, Oct. 2011): *The change has been made.*

EPA Response (Tamara Langton, Dec. 2011): Section 2.4.1.1 (HRIA) Trespasser (page 24) and Section 2.4.1.2 (Breen) Trespasser (page 25) have been revised per above, with also the word "potential" deleted. The response is acceptable.

- **#D-35, Section 2.4.1.2, Presentation of Risk Results – Breen Property, Page 2-18, first partial paragraph, last sentence:** Delete the sentence starting with "Although the total cancer risk"

Commented [TL23]: Now page 25.

KTR Response (Revision 9, Oct. 2011): *The change has been made.*

EPA Response (Julius Nwosu & Marcia Bailey, 12/22/2011): Section 2.4.1.2, page 24, last sentence on page, change to the following: "*The total individual excess lifetime cancer risk of 1×10^{-5} is equal to the maximum allowable risk allowed under MTCA C risk target risk range of 1×10^{-5} .*"

- **#D-36, Section 2.4.1.2, Presentation of Risk Results – Breen Property, Page 2-18, third full paragraph, second and last sentence:** See comment 33.

Commented [TL24]: Now page 25.

KTR Response (Revision 9, Oct. 2011): *The change has been made. See response to comment #D- 33.*

EPA Response (Tamara Langton, Dec. 2011): The response and change is acceptable.

- **#E-31, Page 25, Section 2.4.1.3, Residents in Downgradient Areas (Marcia Knadle, 12/20/2011):** Again, it needs to be clarified that the Downgradient Area is the plume west/northwest of Labree Road, which means it will be a whole different list of wells/borings than is included in this report. Most of the PWs have never had any detection, so there really aren't that many wells/borings that need to be evaluated.

- **#C-12, Page 2-17, Section 2.4.1.3, Residents in Downgradient Areas:** The original comment was Comment #31 from Marcia Bailey's 5/7/2009 memo on the January BRA:

Commented [TL25]: Now pages 25 – 26.

Original Comment #31: It is not clear whether risks from residential exposure to vinyl chloride were adjusted for early-life exposure, as is necessary since vinyl chloride is carcinogenic via a mutagenic mode of action. If this was done, it must be included in a revised BRA. See <http://www.epa.gov/oswer/riskassessment/sghandbook/index.htm> and http://www.epa.gov/reg3hwmd/risk/human/rb-concentration_table/equations.HTM for detailed information.

KTR Response #1 (Revision 6, July 2009): *The vinyl chloride risks in the previous iterations of the BRA had not been adjusted for early life exposure, but are now adjusted in the revised BRA. Text was added to Section 2.4 describing how this was done, including equations. Tables were updated accordingly. Under the residential scenarios, vinyl chloride has not only been detected to-date in groundwater samples from two wells (PW-4 and PW-9); accordingly, this change did not result in a significant change to the risk characterization.*

EPA Response #1 (Marcia Bailey, 7/27/2009): I appreciate that early-life exposure to vinyl chloride has been incorporated into the new version of the BRA. However, on page 2-15 of the redline version only ingestion and dermal risks are shown for direct exposure to groundwater. Inhalation must also be included (not vapor intrusion, but inhalation from being in contact with groundwater and its vapors in domestic uses). This applies to all VOCs. If there is a question about this, the equations provided in old Region 6 screening levels and current Regional Screening Levels show how inhalation is incorporated into exposure to groundwater.

KTR Response #2 (Version 7, April 2010):

- *This baseline risk assessment followed the Guidance of EPA (1989). Exposure to groundwater was calculated for ingestion and dermal routes of exposure per that guidance. The current analysis found that there may be adverse effects to children or adults, primarily from TCE, if COPC concentrations persist and groundwater is used as a drinking source rather than the municipal water supply and will be investigated further in future risk assessments.*
- *There are many models for estimating exposure via inhalation of volatiles from different uses of groundwater, e.g., drinking, showering, bathing. The simplest is using EPA Region 6 Regional Screening Levels (RSLs) compared to measured concentrations of COPCs in groundwater. The non-carcinogenic groundwater*

RSLs range from 21 µg/L for TCE to 6,278 µg/L for methylene chloride. For offsite resident potential future exposure to groundwater, the inhalation HQs are generally less than the ingestion and dermal HQs, and do not drive risk in any scenario. They do add some potential risk, but do not change the overall results. For example, the maximum measured concentration occurs in well MW-32 for PCE of 2700 µg/L. The current HQs are 7.4 for ingestion and 4.46 for dermal exposures, with a total HQ for this well of 11.87. The HQ using the RSL is 2.18, which would increase the HQ for this well, but does not change any of the stated results. For onsite exposures, the greatest added risk from inhalation of groundwater is at the HRIA from PCE. Again, while these additional calculations increase the exposure estimates and the potential risk estimates, they do not change any of the conclusions.

- The same trend in non-carcinogenic groundwater assessment with inhalation exposure is observed with the carcinogenic endpoints.
- It is important to note that any clean-up targets calculated for groundwater in the future will include this pathway of exposure.
- Overall, we believe that the current approach of using ingestion and dermal routes of exposure versus ingestion and inhalation exposures is sufficiently predictive of where onsite and offsite risks may occur.
- Added a bullet to Section 2.4.2 Uncertainties and Limitations with the following text:

“Groundwater exposure from inhalation estimates. Exposure to groundwater was limited to ingestion and dermal contact in this risk assessment. The exposure via inhalation of groundwater was not investigated since it was considered a minor pathway. Using the EPA Region 6 regional screening levels for tapwater in addition to the ingestion and dermal exposure routes, there would be slightly increased risk for the wells with non-cancer HQ’s already greater than 1.0 and for cancer risks greater than 1.0×10^{-6} , but would not change any of the current results. As risk estimates are refined in future risk assessments, the groundwater exposure pathway will be revised based on current guidance procedures.”

EPA Response #2 (Marcia Bailey, 5/6/2010): The response is not acceptable. As indicated in comments to Parametrix of last year, inhalation must be included when estimating risks from exposure to volatile COPCs in groundwater. This is consistent with EPA’s Risk Assessment Guidance for Superfund (RAGS) Part A (which, in Exhibit (flow chart) 6-6, asks if a contaminant under consideration is volatile, and if so, states that transfer to air should be considered; with RAGS Part B (which is not cited in Section 5 of this report, “Literature Cited,” but should be – see <http://www.epa.gov/oswer/riskassessment/ragsb/>), which in Section 3.1 directs the consideration of ingestion and inhalation of VOCs from household water use; and with EPA Regional RSLs, which provide specific equations for consideration of the inhalation of VOCs from use of groundwater. As demonstrated in the pathway-specific RSLs for groundwater, inhalation is a risk driver for a number of VOCs (even if not necessarily all those at this site). EPA Region 10 does not want to set an unfortunate precedent by excluding inhalation in this groundwater exposure pathway analysis for VOCs. [Note: As noted in observations prior to the specific

comments in this memo, RSLs are not Region 6 screening levels. RSLs are representative of all regions, even though they are accessible through Web portals on Regions 3, 6 and 9 only. All references in the report to Region 6 screening levels should be changed to EPA RSLs, and it is recommended that site-related contaminants should be screened against current EPA RSLs.]

KTR Response #3 (Revision 9, Oct. 2011): *An evaluation of risks associated with inhalation of VOCs during showering has been added to the uncertainty sections. As previously noted, RSLs are now incorporated into the document. Please see response to Comment #A-1 under "General Comments."*

EPA Response #3 (Tamara Langton, Dec. 2011): This response is unacceptable. See Marcia Bailey's earlier comments on the same subject.

- **#D-7, Section 2.4.1.3, Page 2-19, Residents in Downgradient Areas, Groundwater Exposures:** Inhalation of volatiles from the use of groundwater as drinking water must be included.

Commented [TL26]: Now page 26.

KTR Response (Revision 9, Oct. 2011): *An evaluation of inhalation of volatiles has been added to the uncertainty section.*

EPA Response (Tamara Langton, Dec. 2011): This response is unacceptable. See Marcia Bailey's earlier comments on the same subject.

SECTION 2.4.2 UNCERTAINTES AND LIMITATIONS

Commented [TL27]: Now pages 30 – 34.

- **#D-39, Pages 2-22 and 2-23, surface water data limitations:** Delete the last sentence in this section. Instead, state that we do not know where the end of the groundwater plume is, nor do we know how much contamination may be discharging to Dillenbaugh Creek downgradient of the currently known extent of contamination. Add a discussion in the uncertainty section acknowledging that the risks associated with both the recreational and the human-exposure-due-to-fish-uptake scenarios may be significantly underestimated if high concentrations discharge to Dillenbaugh Creek.

Commented [TL28]: Now page 31.

KTR Response (Revision 9, Oct. 2011): *The discussion has been changed as directed.*

EPA Response (Tamara Langton, Dec. 2011): Add that the two water samples collected in Dillenbaugh Creek were collected in 2007. Also please clarify and edit the last two sentences of the surface water data limitations paragraph.

- **#C-19, Use of Creeks Assessment (Fish and Water Consumption (Marcia Bailey, 7/27/2009):** Input from Tamara: Since we received information from Ecology that Berwick and Dillenbaugh Creeks are to be protected for fishing and water consumption, Marcia did some calculations that need to be incorporated into this risk assessment. I have attached the e-mails that deal with this in one pdf document. I have also attached a pdf document which has the background information on how Marcia calculated risk from eating fish from Berwick Creek based on maximum PCE in sediment.

Commented [TL29]: Now page 32.

I will touch base with Joe Goulet on the results of this assessment and any impacts to the ecological risk assessment, and will touch base with Marcia on conveying this information to the Washington State Department of Health.

In addition, the information on how these creeks are now classified needs to be incorporated into the RI.

KTR Response #1 (Revision 7, April 2010):

- *Since VOCs are expected to be short-lived in water because of their volatilization to the atmosphere (USEPA 1980, Ambient water quality criteria for dichloroethylenes), this pathway is not considered to be complete for this area. Using the Henrys Law Constant from USEPA EPI Suite (version 4.00, January 2009), the five COPCs have the following predicted half life from a model river: 1.146 hours for 1,2-Dichloroethene (cis), 1.106 hours for Methylene chloride, 1.357 hours for Tetrachloroethene, 7.919 hours for Tetrahydrofuran, 1.238 hours for Trichloroethene, 0.8234 hours for Vinyl chloride. The half lives for the five VOCs in model lakes are all around 3 days.*
- *In addition, because VOCs are not readily incorporated and concentrated in fish tissue, this pathway is not considered to be complete for this area. The BCF*

values for the six primary COPCs range from 2 to 83 (from the HHRAP database, EPA 2005). These values were derived based on their log Kow values (which ranged from 0.46 to 3.4). Bioconcentration is most likely to occur with chemicals with log Kow values from 5-8 (Hoffman et al. 1995). Calabrese (1992) notes that "volatile organic compounds (VOCs), such as trichloroethylene and tetrachloroethylene, tend to be widely distributed in air, and exposure via the [aquatic] food chain is of less concern than other exposure pathways." From EPA (1992), fish BCFs greater than 1000 were characterized as having "a high potential for bioaccumulation", BCFs of 500 were characterized as "moderate potential for bioaccumulation", and BCFs of 10-130 were characterized as "potential for bioaccumulation is low". Since all of the site COPCs have BCFs less than 100, they are considered to have low bioconcentration potential and will be a very minor component of any fish species in Berwick and Dillenbaugh Creeks in comparison to the surface water concentrations.

- Therefore, because the six primary COPCs from this site are not expected to persist in the surface water and bioconcentrate into fish tissue, this pathway was not considered as a complete exposure pathway and will not be evaluated further.

EPA Response #1 (Marcia Bailey, 5/6/2010): The response is not acceptable. Uptake of VOCs into fish must be recognized, not dismissed. VOCs have been demonstrated to accumulate in fish tissue, primarily by Roose and Brinkman in North Sea studies (see http://www.pegasoproject.eu/wiki/Volatile_organic_compounds_in_North_Sea_fish) but also by Region 10 studies of crab and demersal finfish acquired from the Hylebos Waterway offshore from the Occidental Superfund site, in which every specimen contained site-related VOCs. (See attached file of the poster presentation of this information.) The BRA must consider this exposure pathway to humans consuming fish from the creek. While uncertain, the MTCA 730 equations that utilize BCFs and Ecology's standard adult fish consumption rates should be utilized. BCFs should be obtained from the chemical database associated with EPA's Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (<http://www.epa.gov/wastes/hazard/tsd/td/combust/riskvol.htm>). The uncertainties associated with estimating uptake of VOCs to fish utilizing BCFs and Ecology fish consumption rates (relative to this creek) should be noted.

EPA Response #2 (Joe Goulet, 5/26/2010): I agree that the possibility of the uptake of VOCs into fish should be recognized. I am not sure that going beyond this advances the ecological risk assessment.

KTR Response #2 (Revision 9, Oct. 2011): An evaluation of exposure due to human consumption of fish from the creek has been added to the uncertainty section. The evaluation utilizes the MTCA 730 equations, Ecology's standard adult fish consumption rates, and BCFs obtained from the chemical database associated with EPA's Human Health Risk Assessment Protocol for Hazardous Waste Combustion Facilities (<http://www.epa.gov/wastes/hazard/tsd/td/combust/riskvol.htm>). Uncertainties

associated with estimating uptake of VOCs to fish utilizing BCFs and Ecology fish consumption rates (relative to this creek) are now discussed in Section 2.4.2.

EPA Response #3 (Tamara Langton, Dec. 2011): The discussion on exposure via ingestion of fish in the uncertainties section is acceptable.

- **Comment #D-38, Pages 2-21 thru 2-23, Uncertainties and Limitations:** In addition to comment 38, EPA may submit additional revisions to this section in conjunction with finalizing the data gaps memo.

Commented [TL30]: Now pages 30 – 34.

KTR Response (Revision 9, Oct. 2011): The referenced memorandum describing data gaps and the need for additional data was updated and incorporated into the September 2011 Draft final RI Report. Section 2.4.2 and Section 4 (Conclusions) of the risk assessment report were revised to incorporate current information on data gaps and the need for additional data from the September 2011 RI Report.

EPA Response (Tamara Langton, Dec. 2011): On page 34, please reference the Study Limitations Memo in the RI. Otherwise, the response is acceptable.

- **#E-32, Page 33, Section 2.4.2, Uncertainties and Limitations (Marcia Bailey, 12/20/2011):** The bullet item regarding the assessment of groundwater as a source of inhalation exposure should be removed, since it will be incorporated into the body of the risk assessment, as opposed to simply an uncertainty.
- **#E-33, Page 34, Section 2.4.2, Uncertainties and Limitations (Marcia Bailey, 12/20/2011):** The bullet item regarding TCE toxicity values should be removed, as we now have IRIS toxicity and potency values for oral and inhalation exposures.
- **#E-34, Page 34, Section 2.4.2, Uncertainties and Limitations (Marcia Bailey, 12/20/2011):** The bullet item regarding updated toxicity values and methodologies should be removed, and all risks and hazards estimated in the BRA should be evaluated using current toxicity and potency values, since values have changed for the major VOC COPCs for the Site. [This statement assumes the PCE IRIS file will be released before the end of 12/2011.] Since there is no current toxicity value available, statements and estimates of risk regarding tetrahydrofuran can be deleted, except to state that one or more toxicity values are expected to be available sometime in 2012. [Note: this will require some changes in tables and text.]

SECTION 3 ECOLOGICAL RISK ASSESSMENT

Commented [TL31]: Now pages 35 – 48.

- **#B-33, Page 3-1, Chapter 3, Ecological Risk Assessment (Marcia Bailey, 5/7/2009 & Joe Goulet):** Total Petroleum hydrocarbons should be included in the evaluation for terrestrial organisms. In addition to the human health portion of the BRA, TPH is also to be listed as a presumptive primary COPC in the ecological portion of the BRA, until EPA has sufficient information to rule it in or out as a definite COPC.

Commented [TL32]: Now page 38.

KTR Response #1 (Revision 6, July 2009): TPH were added to the chemical screening for ecological receptors. Soil concentrations are now compared to MTCA ecological screening levels in Table 749-2. Maximum concentrations of diesel and gasoline range organics are below their respective levels and are therefore not evaluated further in the ecological risk assessment. As discussed in the general response to Comment #3, TPH may be evaluated further in future iterations of this BRA once additional data are collected.

EPA Response #1 (Joe Goulet, 5/26/2010): It needs to be clear that the referenced Table 749-2 is a MTCA table, and not a table included in the BRA report.

KTR Response #2 (Revision 9, Oct. 2011): The reference has been edited to indicate MTCA Table 749-2.

EPA Response #1 (Tamara Langton, Nov. 2011): MTCA Table 749-2 is referenced in BRA Revision 9 on page 36, Section 3.1.1 (Screening Methods and Ecotoxicity Values). The edit and response is acceptable.

- **#B-34, Page 3-2, section 3.1.1.1, soil, first paragraph (Marcia Bailey, 5/7/2009):** It would be helpful to state how many of the analytes were detected with concentrations exceeding their risk-based benchmark (listed as the fourth criteria for screening in the section previous to this, on the same page).

Commented [TL33]: Now page 36.

KTR Response (Revision 6, July 2009): The number of analytes exceeding risk-based benchmarks is identified in the 4th paragraph of this section.

EPA Response #1 (Marcia Bailey, 7/27/2009): KTR's response is acceptable.

EPA Response #2 (Joe Goulet, 5/26/2010): The response acceptable.

- **#B-35, Page 3-2, section 3.1.1.1., Soil, third paragraph (Marcia Bailey, 7/27/2009):** An OEA eco risk assessor should advise as to whether the list represents a hierarchy of sources, i.e., what would be used if more than one screening level exists for a certain chemical.

Commented [TL34]: Now page 37.

KTR Response: *This appears to be an internal comment on whether EPA wants to involve an OEA risk assessor.*

EPA Response (Joe Goulet, 5/26/2010): The sources of soil screening levels are appropriate and any exceedances of a screening level were reported in the table (Table 3-1).

- **#B-36, Page 3-3, section 3.1.1.2, Surface Water, second paragraph (Marcia Bailey, 7/14/2009):** An OEA eco risk assessor should advise as to whether the sources of surface water screening level values are appropriate.

Commented [TL35]: Now pages 37 – 38.

KTR Response: *This appears to be an internal comment on whether EPA wants to involve an OEA risk assessor.*

EPA Response (Joe Goulet, 5/26/2010): The surface water screening values are appropriate.

- **#B-37, Page 3-3 and 3-4, section 3.1.1.3, Sediment (Marcia Bailey, 7/14/2009):** An OEA eco risk assessor should advise as to whether this evaluation was done appropriately.

Commented [TL36]: Now page 38.

KTR Response: *This appears to be an internal comment on whether EPA wants to involve an OEA risk assessor.*

EPA Response (Joe Goulet, 5/26/2010): The evaluation was done appropriately.

- **#D-40, Page 3-4, Section 3.1.2, and Selection of COPCs:** TPH is to be listed as a presumptive primary COPC until EPA has sufficient information about its site-related concentration in environmental media.

Commented [TL37]: Now page 38.

KTR Response (Revision 9, Oct. 2011): *TPH has been listed as a presumptive primary COPC.*

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

- **#B-38, Remainder of ecological risk assessment (through page 3-14) (Marcia Bailey, 7/14/2009):** An OEA risk assessor should review this material.

Commented [TL38]: Now pages 39 – 48.

KTR Response: *This appears to be an internal comment on whether EPA wants to involve an OEA risk assessor.*

EPA Response (Joe Goulet, 5/26/2010): The evaluations were done appropriately.

- **#D-41, Page 3-5, Section 3.2.1, Receptor Populations:** It is not clear what the purpose of this section is. Is it not to just introduce the more detailed discussion of receptors in sections 3.2.11, 3.2.1.2 and 3.2.1.3? In addition, the use of the terms “terrestrial and aquatic biota” and “terrestrial mammals” in this section vs. how receptors are categorized by type (Wildlife, Aquatic Life, Terrestrial Plant Receptors, and receptor sub-type (Wildlife = avian receptors, mammalian receptors; Aquatic Life = salmon receptors, benthic receptors) in subsequent sections of Chapter 3 is confusing. This whole introduction piece to receptors needs to be more concise.

Commented [TL39]: Now pages 39 – 40.

KTR Response (Revision 9, Oct. 2011): *The section has been edited for clarity.*

EPA Response (Tamara Langton, Dec. 2011): This section has been much improved. The edits and response are acceptable.

- **#D-42, Page 3-5, Section 3.2.1, Receptor Populations, fourth paragraph, third sentence:** Delete sentence starting with “Furthermore, it is unlikely ...”

Commented [TL40]: Now page 39.

KTR Response (Revision 9, Oct. 2011): *The sentence has been deleted.*

EPA Response (Tamara Langton, Dec. 2011): This is acceptable.

- **#D-43, Page 3-5, Section 3.2.1, and Receptor Populations, fourth paragraph, fourth sentence:** Is this sentence trying to state the same thing as the second sentence in this paragraph? These sentences do not flow together well.

Commented [TL41]: Now page 39.

KTR Response (Revision 9, Oct. 2011): *The section has been edited for clarity.*

EPA Response (Tamara Langton, Dec. 2011): This section has been much improved. The edits and response are acceptable.

- **#D-44, Page 3-5, Section 3.2.1, Receptor Populations, fourth paragraph, last sentence:** Is this sentence trying to state the same thing as the first sentence in the fifth paragraph?

Commented [TL42]: Now page 39.

KTR Response (Revision 9, Oct. 2011): The section has been edited for clarity.

EPA Response (Tamara Langton, Dec. 2011): This section has been much improved. The edits and response are acceptable.

- **#D-45, Page 3-5, Section 3.2.1, Receptor Populations, fifth paragraph, first sentence:** Move the (e.g., mallard duck, raccoon, white tailed deer) to the end of the sentence.

Commented [TL43]: Now page 39.

KTR Response (Revision 9, Oct. 2011): The section has been edited for clarity.

EPA Response (Tamara Langton, Dec. 2011): This section has been much improved. The edits and response are acceptable.

- **#D-46, Page 3-5, Section 3.2.1, Receptor Populations, fifth paragraph, second and third sentences:** Combine these two sentences into one sentence such as "Terrestrial biota could also be exposed to PCE volatilizing to outdoor air; however, the exposure duration would be short (e.g. occurring during hunting or prey-washing events) and the pathway insignificant." So – does this mean that this receptor exposure pathway was not evaluated in the BRA?

Commented [TL44]: Now page 40.

KTR Response (Revision 9, Oct. 2011): The section has been edited for clarity.

EPA Response (Tamara Langton, Dec. 2011): This section has been much improved. The edits and response are acceptable.

- **#D-47, Page 3-5, Section 3.2.1, and Receptor Populations, and sixth paragraph, first sentence:** How can you conclude that there is potential for aquatic biota to come into contact with contamination when no discussion of aquatic biota is included in Section 3.2.1 except to mention that Coho salmon, a species of special concern, use the creek?

Commented [TL45]: Now page 39 and 40.

KTR Response (Revision 9, Oct. 2011): The section has been edited for clarity.

EPA Response (Tamara Langton, Dec. 2011): This section has been much improved. The edits and response are acceptable.

- **#C-16, Section 3.5.1 Mammalian Receptors, Raccoon, page 3-13 of the July 2009 red-line BRA (Marcia Bailey, 7/27/2009):** Why is this language included, given that the raccoon is a mammal: “Although there is added uncertainty in the NOAEL and LOAEL values because they are based on mammalian toxicity data...”

Commented [TL46]: Now page 40.

KTR Response #1 (Revision 7, April 2010):

- Changed to “... because they are based on rodent toxicity data...”
- Also made this change to the next paragraph for White-tailed deer

EPA Response #1 (Marcia Bailey, 5/6/2010): The response is adequate.

EPA Response #2 (Joe Goulet, 5/26/2010): The response is acceptable.

SECTION 4 BASELINE RISK ASSESSMENT SUMMARY

Commented [TL47]: Now pages 49 – 56.

- **#D-48, Page 4-1, Baseline Risk Assessment Summary:**

Commented [TL48]: Now pages 49 – 56.

a) Please ensure that the description of the site is consistent with how it is being described in the RI and FS reports, especially when describing the “downgradient” areas.

b) TPH is to be listed as a presumptive primary COPC until EPA has sufficient information about its site-related concentration in environmental media.

KTR Response (Revision 9, Oct. 2011): The section has been edited for consistency. TPH has been listed as a presumptive primary COPC.

EPA Response (Tamara Langton, Dec. 2011): The description of the site, especially what is considered “downgradient,” is not consistent. TPH is listed as a presumptive remedy.

- **#C-2, Page 4-1, Baseline Risk Assessment Summary, 1st paragraph, last sentence (Tamara Langton, 1/26/2010):** To be consistent with how the site and the BRA is described in the Section 1.2, you need to include that this BRA also looked at the areas west of Labree Road, too, and what the term “downgradient areas” refers to.

Commented [TL49]: Now page 49.

KTR Response (Revision 7, April 2010): Edited the text in the first paragraph of section 4 to reflect language in Section 1.2 concerning the description of the downgradient area to the following: “In addition, the BRA evaluated areas downgradient from the HRIA and cross-gradient from the Breen Property. This downgradient area includes the Thurman Berwick Creek area and the areas west of Labree Road.”

EPA Response #1 (Marcia Bailey, 5/6/2010): The response appears adequate.

EPA Response #2 (Tamara Langton, Dec. 2011): As stated in earlier comments, in Revision #9, the definition of the site and which sampling locations are located in the TBCA and west of Labree Road need to be fixed in this BRA.

- **#C-13, Page 4-2, Chapter 4, Summary of the Human Health Risk Assessment.**

The original comments were Comments #39 thru 41 from Marcia Bailey's 5/7/2009 memo on the January 2009 BRA.

Commented [TL50]: Now pages 50 – 54.

Original Comment 39, Page 4-2, Chapter 4, Summary of the Human Health Risk Assessment, first bullet item (indoor commercial/industrial worker):

Future exposure to VOCs in groundwater as drinking water would entail inhalation of vapors in addition to ingestion.

KTR Response #1 to Comment 39 (Version 6, July 2009): *Inhalation of vapors from groundwater is noted in the first sub-bullet under the first bullet.*

Original Comment 40, Page 4-2, Chapter 4, Summary of the Human Health Risk Assessment, second bullet item (Construction/utility worker): See comment #39.

KTR Response #1 to Comment 40 (Version 6, July 2009): *The bullet was edited accordingly.*

Original Comment 41, Page 4-2, Chapter 4, Summary of the Human Health Risk Assessment, third bullet item (resident receptor):

Inhalation of VOCs in vapors from use of groundwater as drinking water should be included. This states dermal contact was included, and on page 4-3 it is stated that bathing and dermal pathways were evaluated for downgradient residents for contact with groundwater. However, as noted in comment 22, in Table 2-8a (Exposure Parameters for Human Health Exposed to Groundwater, Soil, Surface Water, and Sediment), there are no chemical-specific absorbed doses per event values provided, nor are values provided for most of the variables needed to compute absorbed dose per event values. Therefore, it is not clear how this pathway was evaluated.

KTR Response #1 to Comment 41 (Revision 6, July 2009): *The bullets are summarizing the exposure pathways evaluated in the BRA. Since residents are currently on the municipal water supply and not currently drinking groundwater, we made no attempt to model VOC vapors from groundwater. Regarding dermal exposures, more detail was added to the BRA on how dermal exposures were evaluated.*

EPA Response #1 (Marcia Bailey, 7/27/2009): Response to KTR responses to comments #39 thru 41: The responses indicate that Parametrix believed I was referring to exposure to VOCs via inhalation from vapor intrusion. I was not. As described above, inhalation of VOCs is a component of direct exposure to groundwater used as a drinking water/domestic use source, in addition to dermal and ingestion. Parametrix needs to include inhalation, ingestion and dermal for direct contact with groundwater for all receptors where this is a current or future exposure. Again please consult Region 6 or Regional Screening Level equations for contact with VOCs in waters used as drinking water and in domestic uses. Note

also that there is a discrepancy among the receptors/bullet items: indoor worker lists only ingestion as exposure for groundwater as drinking water while construction worker and resident include ingestion and dermal. All three should include, for VOCs, ingestion, dermal and inhalation.

KTR Response #2 (Revision 7, April 2010): *This is the same comment as #12. Please refer to that response.*

EPA Response #2 (Marcia Bailey, 5/6/2010): This response refers to the response to comment 12 and is not acceptable for the reasons stated above.

KTR Response #3 (Revision 9, Oct. 2011): *See response to comment #12.*

EPA Response #3 (Tamara Langton, Dec. 2011): The response is still not acceptable. See Marcia Bailey's earlier comments on the same subject.

- **#D-49, Pages 4-2 thru 4-4, Summary of the Human Health Risk Assessment:**

Commented [TL51]: Now pages 50 – 54.

a) The exposure pathways listed in this summary do not match those listed in Table 2-6.

KTR Response (Revision 9, Oct. 2011): *The text and Table 2-6 have been edited for consistency.*

EPA Response (Tamara Langton, Dec. 2011): See response to comment #D-52 regarding Table 2-6.

b) In the descriptions of all the receptors, the current exposure pathways should be discussed first followed by the future exposure pathways, as was done in Section 2.4.1.

KTR Response (Revision 9, Oct. 2011): *The text has been edited to discuss current then future exposure pathways.*

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

c) In the description of the Breen Construction Worker, the word "more" should be deleted from the second to last sentence, as it precedes the word "less" and appears to have erroneously been included.

KTR Response (Revision 9, Oct. 2011): *The extra word has been deleted from the sentence.*

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

d) In the description of the Breen Construction Worker, the last (new) sentence, the reference to indoor air should be deleted, as not relevant to construction workers in the evaluated exposure scenario.

KTR Response (Revision 9, Oct. 2011): *The reference to indoor air has been deleted.*

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

e) In the description of the Breen Construction Worker, the last (new) sentence, the phrase “do not pose any risks” should be amended to “do not pose unacceptable risks,” since risks have been estimated and are quantitatively noted as being $6E-6$ earlier in the paragraph.

KTR Response (Revision 9, Oct. 2011): *The sentence has been amended.*

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

f) For Downgradient Residents, inhalation of volatiles from the use of groundwater as drinking water must be included.

KTR Response (Revision 9, Oct. 2011): *An evaluation of inhalation of volatiles from drinking water has been added to the uncertainty section.*

EPA Response (Tamara Langton, Dec. 2011): It hasn't actually. A discussion on inhalation from showering has been included. However, see Marcia Bailey's latest response to comment #

g) In the discussion “HRIA and Breen Potential Trespasser” on the same page, “8” and “1” should be written as “eight” and “one”; numbers greater than nine are appropriately presented numerically. (There are exceptions; see <http://www.epa.gov/stylebook/writing.html>.)

KTR Response (Revision 9, Oct. 2011): *“8” and “1” have been changed to “eight” and “one.”*

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

h) In the discussion “HRIA and Breen Potential Trespasser,” the phrase “exposures from outdoor air and soil were less than 1×10^{-6} ” should be changed to “excess individual lifetime cancer risks due to exposures to outdoor air and soil are estimated to be lower than 1×10^{-6} .”

KTR Response (Revision 9, Oct. 2011): *The change has been made.*

EPA Response (Tamara Langton, Dec. 2011): It was written “individual excess...” rather than what is suggested above; however, the change is acceptable.

- **#C-4, Page 4-5, Conclusions ..., 2nd bullet (Tamara Langton, 1/26/2010):**

Replace the first 3-sentences with the following:

“The overall results of the human health risk assessment indicate that current contaminant concentrations (predominately PCE) in groundwater represents a potential for adverse risks to future on-site workers and downgradient residents if the plume persists and groundwater is used for domestic purposes. Currently, however, these receptors are either connected to the municipal water system or are not currently impacted by the contaminated groundwater plume. “

KTR Response (Revision 7, April 2010): *Made the suggested change.*

EPA Response (Marcia Bailey, 5/6/2010): The suggested changes were made and are appropriate.

Commented [TL52]: Now page 55, 2nd bullet.

- **#C-3, Page 4-4, 1st paragraph (beginning with “The overall results ...”), (Tamara Langton, 1/26/2010):** This is a conclusion paragraph and should be deleted. However, the first few sentences describes the groundwater risks much better than how it is described in the second bullet of the Conclusions section.

KTR Response #1 (Revision 7, April 2010): *Deleted paragraph, incorporated sentences into the Conclusions bullet*

EPA Response # 1 (Marcia Bailey, 5/6/2010): The response appears adequate, but I recommend that the words “individual excess lifetime” be added between “appreciable” and “risk” in the new sentence on page 4-6 that stars with “[h]owever, the exceedances is not significant.”

KTR Response #2 (Revision 9, Oct. 2011): *The words “individual excess lifetime” have been added between “appreciable” and “risk.”*

EPA Response #2 (Tamara Langton, Dec. 2011): As requested, this was changed on page 55, 4th paragraph.

Commented [TL53]: Now incorporated in pages 55 – 56.

- **#C-15, Changes made to Baseline Risk Assessment Summary, specifically the second bullet item on the July redline version on page 4-6 regarding the ecological risk assessment (Marcia Bailey, 7/27/2009):** I did not see Joe Goulet’s comments on the previous version of the BRA, so I don’t know if the language in this revised bullet item are based on his recommendations. However, the statements in this item are not reflected in the ecological risk section, especially references to “minimal” risks and “highly conservative exposure estimates.” See the uncertainty discussion at section 3.5.4. Much less strong language is included about conservativeness. See also the discussion of risk characterization of mammalian receptors, section 3.5.1. For example, the first paragraph under section 3.5.1, Wildlife includes this statement: “An HQ greater than 1.0 suggests that the COPC may pose an unacceptable risk to the wildlife receptor but more detailed evaluations

Commented [TL54]: Now pages 55 (last bullet on this page) and top of page 56.

may be necessary to confirm the level of risk posed.” While there were some wildlife HQs greater than 1.0, the need for “more detailed evaluations” is not addressed in the BRA Summary. It would appear that there needs to be a coming-together of the conclusions drawn in the main text of the ecological risk assessment and the summary of that assessment.

KTR Response #1 (Revision 7, April 1020):

- *In Section 3.5.4 Uncertainties: to the end of the BRA exposure assessment methods bullet – added “The percentage of time a receptor would spend in a site of this size (area use factor) could be used to refine the risk estimates for larger birds and mammals.”*
- *The EcoRA paragraph in the Conclusions section (page 4-6) was changed to read: The potential risk estimates for ecological receptors can be refined in further evaluations since (1) highly conservative exposure estimates were utilized in this BRA, and (2) the HRIA spill area is generally confined to a small area within Berwick Creek, although PCE (but not the other COPCs) was detected in Dillenbaugh Creek surface water.*

EPA Response #1 (Marcia Bailey, 5/6/2010): This is a response to my comment on the ecological portion of the BRA, so I would like to have Joe Goulet review the response, as he provided comments on a previous version of the BRA. However, the response does seem to adequately address my concerns.

EPA Response #2 (Joe Goulet, 5/26/2010): The response is acceptable.

- **#C-5, Pages 4-5 and 4-6, Conclusions (Tamara Langton & Julius Nwosu, 1/26/2010):** I am attaching Julius' Nwosu's full comment memo on the July 2009 BRA (8/8/2009) as many of his conclusions on the risk assessment are stated very clearly and concisely. Parametrix should review these and incorporate/replace where appropriate in the conclusion section of the BRA.

Commented [TL55]: Now pages 55 – 56.

KTR Response #1 (Revision 7, April 2010): Conclusion section was edited to simplify conclusions, using examples from Julius' comment memo.

EPA Response #1 (Marcia Bailey, 5/6/2010): See New Comments on April 2010 BRA report.

KTR Response #2 (Revision 9, Oct. 2011): Comments addressed. See responses on April 2010 BRA report.

EPA Response #2 (Tamara Langton, Dec. 2011): The responses are acceptable.

- **#D-50, Pages 4-5 thru 4-6, Conclusions of the Hamilton Labree Roads Baseline Risk Assessment:**

a) The / in the title of this subsection needs to be deleted.

KTR Response (Revision 9, Oct. 2011): *The change has been made.*

EPA Response (Tamara Langton, Dec. 2011): The response is acceptable.

b) First bullet. Please ensure that the description of the site is consistent with how it is being described in the RI and FS reports, especially when describing the “downgradient” areas.

KTR Response (Revision 9, Oct. 2011): *The description has been revised to be consistent with text. See earlier comments on the same.*

EPA Response (Tamara Langton, Dec. 2011): The description is not consistent.

Commented [TL56]: Now pages 55 – 56.

REFERENCES

- **#E-35, Page 61, References, USEPA 2009 (Marcia Bailey, 12/20/2011):**
This should be 2009a to reflect text citations to this document; there is a USEPA 2009b on page 62.
- **#E-36, Page 62, References, USEPA 2011 (Marcia Bailey, 12/20/2011):** At the end of this citation, with is for the most recent RSL tables, "November" should be added before the period at the end.

TABLES

- **#E-37 (Marcia Bailey, 12/20/2011):** Please note that not all needed changes to the tables are noted here. As mentioned in earlier comments, changes based on toxicity and potency values and the incorporation of inhalation from potential future groundwater exposure will require numerous changes to tables as well as within the text of the BRA.

- **#E-38, Table 2-2 – There need to be a number of changes to this table, mainly to the GW lists (Marcia Knadle, 12/20/2011):**

To be grouped for evaluating GW EPCs:

HRIA	Breen Bldg C area* (mainly PCE)	Breen Bldg B area* (mainly VC) – NEW	TBC Area -- NEW (was “Downgradient”)
AB-1	MW-8	B-14	MW-31
AB-2	MW-19	MW-17	MW-32
AB-3	MW-20	MW-18	PW-9
AB-4	MW-21	SP-6	RS-30
AB-8	MW-27	SP-8	RS-31
AB-650	MW-29		RS-33
MW-9	MW-30**		
MW-600	MW-34		Need to add:
MW-601	RS-7		B-17
MW-602	RS-11		
MW-603	RS-12		
MW-604	RS-15A		
MW-605	RS-16		
MW-R1	RS-17		
MW-R2	RS-17A		
MW-R5			
MW-R6	Need to add:		
MW-R7	SG2-8		
MW-R8	SG2-9		
MW-R10	SG2-15		
	SP-1		
Need to add:	SP-2		
B-2	SP-3		
B-2A	SP-4		
B-2B			
B-2C			
B-2D			
B-26			
GP-1			
GP-500			
GP-501			
GP-502			

GP-503			
GP-505			
GP-506			
GP-507			
GP-508			
GP-510			
GP-513			
GP-521			
GP-522			
GP-528			

*Use whichever generates the higher GW risk value for the Breen future worker risk scenarios.

**Please note that the 13-Nov-03 sample for MW-30 somehow lost all its U qualifiers in the data base. All of the non-PCE “detections” are really non-detects.

Not to be grouped (evaluate individually as was done in the April 2010 BRA):

Downgradient of all the source areas (= west of Labree Road)	
B-11	PW-31
MW-25	PW-32
MW-28	PW-33
PW-5	PW-34
PW-6	PW-35
PW-7	PW-36
PW-16	PW-37
PW-17	PW-38
PW-19	RS-20
PW-20	RS-21
PW-21	RS-22
PW-22	RS-23A
PW-24	RS-41
PW-25	RS-42
PW-26	RS-43
PW-27	RS-47
PW-28	RS-48
PW-29	RS-49
PW-30	

To the extent that toxicity numbers haven’t changed, it may be possible to import the EPC and risk evaluations from the April 2010 version.

Upgradient list – I’m not sure what the point of this list is, for either soil or groundwater, since no EPCs seem to have been derived. It may have been included originally for completeness (just so that all the data points ended up on one list or another). However, now that we’re grouping sub areas for the 3 source areas, many wells and borings in between those sub-areas are being left out anyway, so completeness is a moot point. If this list is to be kept in the table, PW-2 should be removed (it was located cross-gradient and managed to pull in hundreds of ppb PCE from the HIRA, so it wasn’t truly

upgradient) and PW-23 should be removed (it's a deep aquifer well that was drilled to replace PW-2, which was decommissioned). I don't even know what WJ1 is, but there's no associated GW data in Table 2-3 of the RI report, so it should be removed.

- **#E-39, Table 2-3, page 1 (Marcia Bailey, 12/20/2011):** The screening level for tetrahydrofuran, attributed to Region 6, should be removed as it is no longer current.
- **#E-40 Table 2-3 (Julius Nwosu, 10/12/2011):** The screening value reported for PCE (0.01 µg/L) is wrong. It should be 0.11 µg/L.
- **#C-14, Tables 2-3 and 2-4, Summary of Chemicals Evaluated in Groundwater by Geographic Location and Chemical:** The original comments were Comments 44b and 45b from Marcia Bailey's 5/7/2009 memo on the January 2009 BRA.

Original Comment 44b, Table 2-3: The use of the term "NSR" does not comport with the screening level criteria in section 2.1.3. The footnotes indicate that "NSR" means "not a source related chemical therefore excluded from further analysis ." First, consideration should be given to whether a chemical is related to releases from the *site*, not just from a particular source at the site. Second, NSR was applied inappropriately to gasoline (presumably gasoline-range organics) and to octanoic acid. In the case of gasoline, it was detected 50% of the time, at a concentration exceeding the screening level. It should be retained as a COPC. Octanoic acid was detected 100% of the time (one sample), but there is not available screening value for this chemical. It can be excluded as a COPC based on that criterion, but not based on an assumption that it is not site-related.

KTR Response to Comment 44b (Revision 6, July 2009): Gasoline, and TPH in general, was addressed per previous comments above. The table was changed to show that octanoic acid was not retained as a COPC because no screening value is available.

Original Comment 45b, Table 2-4: The "NSR" issue described in the previous comment applies to this table also. The chemical 2-hexanone was detected in 25% of samples in downgradient areas and in the HRIA soil and in 20.4% of samples on the Breen Property, but it has not screening value. It may be excluded as a COPC based on that, not on an assumption that it is not related to site releases. Gasoline was detected in 66% of samples, above the screening value, on the Breen Property and should be retained as a COPC.

KTR Response to Comment 45b (Revision 6, July 2009): Gasoline, and TPH in general, was addressed per previous comments above. The table was changed to show that 2-hexanone was not retained as COPC because no screening value is available.

EPA Response #1 (Marcia Bailey, 7/27/2009): The responses do not explain why gasoline was not retained as a COPC, as it exceeded the criteria for doing so in the

two instances noted in my comments. The remainder of comments 44 and 45 were appropriately responded to.

KTR Response #2 (Revision 7, April 2010): *A reflected in the COPC text on page 2-5, there currently are not enough data to evaluate petroleum hydrocarbons for this assessment. These will be retained and addressed in future assessments, but will not be a COPC evaluated in this assessment.*

EPA Response #2 (Marcia Bailey, 5/6/2010): The response is acceptable.

- **#D-52, Table 2-6:** This table needs to be consistent with text. See earlier comments on the same.

KTR Response (Revision 9, Oct. 2011): *The table has been edited for consistency.*

EPA Response (Tamara Langton, Dec. 2011): The table still does not seem to be consistent with the text. For example, on page 14 under the HRIA and Breen Property, there is a receptor called Indoor commercial/industrial worker. There does not appear to be a commercial/industrial worker on Table 2-6. In addition, there are asterisks and double asterisks on Table 2-6, yet no footnote explaining what these mean.

- **#E-41, Table 2-7a, Page 1 of 2 (Marcia Knadle, 12/20/2011):** The listed maximum value for vinyl chloride in the Breen Property GW section is 10 ppb, apparently from the 13-Nov-03 sample for MW-30, which somehow lost all its U qualifiers in the data base, so it presumably should be 10 U. As such, the maximum vinyl chloride value in this well grouping should be significantly less. If the Building B vinyl chloride plume turns out to have a higher overall drinking water risk associated with it, this Building C area group will be replaced in this analysis anyway.
- **#E-42, Table 2-7e (Julius Nwosu, 10/12/2011):** EPC for Trench Air in HRIA: EPC values reported are in µg/L, but should be in µg/m³.
- **#E-43, Table 2-8a, page 1 (Marcia Bailey, 12/20/2011):** I could not locate a footnote to explain the superscript (a) associated with the adult dermal absorption fraction of 0.1. I could not determine where ABS values associated with Site COPCs are provided in the BRA. (See comment 13 above, regarding the use of ABS values for VOCs.)
- **#E-44, Table 2-8a (Marcia Bailey, 12/20/2011):** It appears that all exposure parameters and intake equations are based on EPA guidance. Because MTCA equations are also used in this BRA to evaluate exposures, information should be included showing the relevant MTCA exposure parameters and intake equations, to the extent they have been used.

- **#E-45, Table 2-8a (Marcia Bailey, 12/20/2011):** Intake equations and parameters for contact with soil contaminated with VOCs should be shown without inclusion of dermal exposure, as EPA does not include dermal exposure to VOCs in soil for Superfund exposure/risk assessments, except for those included in Exhibit 3-4 in RAGS E or in defensible independent sources.
- **#E-46, Table 2-8b (Marcia Bailey, 12/20/2011):** For EPA parameters and intake equations for inhalation of air, remove references to inhalation rate and body weight, as these are not used in Superfund exposure/risk assessment, since RAGS Part F was published in 2009 (which should be used and cited). Please make sure the inhalation intake equations comport with RAGS Part F and the RSL equation exposure assumptions, where appropriate for the specific exposure scenario.
- **#E-47, Table 2-8b (Marcia Bailey, 12/20/2011):** It is not clear why MTCA parameters and exposure equations are included in this table but not in Table 2-8a.
- **#E-48, Table 2-9a-e (Julius Nwosu, 10/12/2011):** The citation for the various toxicity values are outdated; should be revisited and corrected. EPA has just published new toxicity values for TCE. See EPA IRIS for new values (EPA 2011).
- **#E-49, Table 2-9a, Oral noncancer toxicity values (Marcia Bailey, 12/20/2011):** Oral noncancer toxicity values, uncertainty factors and primary target organs should be updated for cis-1,2-dichloroethylene, methylene chloride, tetrahydrofuran (which has none at this time), trichloroethylene and, if available at the time of revising the BRA, tetrachloroethylene. If tetrachloroethylene has no updated IRIS values, please correct the source of the PCE noncancer toxicity values to CalEPA.
- **#E-50, Table 2-9b, Inhalation noncancer toxicity values (Marcia Bailey, 12/20/2011):** Comment #E-49 applies to this table as well. There should be a footnote or other indication that extrapolated inhalation RfDs are used only in MTCA equations.
- **#E-51, as noted in an earlier comment, the Table of Contents refers to two sets of tables for inhalation toxicity and potency values. The following specific comments are offered (Marcia Bailey, 12/20/2011):**
 - a) For noncancer, the chronic RfC for some chemicals are not the same in both tables.
 - b) It should be clear that where extrapolated RfDs (from RfCs) are presented, they are for use in MTCA equations only, as EPA equations do not use extrapolated values. For cancer, Table 2-9d has units in (1 per mg/kg-day). The EPA values should be unit risks in units of (1 per ug/m3).

- c) Table 2-13c has two values for vinyl chloride, citing CLARC for residential exposures. CLARC specifies the use of the higher cancer potency values (inhalation and oral exposures) from IRIS (representing lifetime risk) for all exposures that could include pregnant women, so this would presumably include all exposures for this Site. (This is because of the mutagenic mode of action of vinyl chloride). Therefore, there is no reason to include two different cancer potency values, unless it is for informational purposes only, and so indicated.
- d) Please make corrections as needed to the inhalation tables as needed, including updated toxicity and potency values for cis-1,2-DCE, TCE, methylene chloride (dichloromethane, from IRIS) and PCE (if available from IRIS before the new version of the BRA has been completed).

- **#E-52. Table 2-9c, oral cancer toxicity values (Marcia Bailey, 12/20/2011):**

- a) The title should be changed to "Oral Cancer Potency Factors."
- b) It is not clear whether the oral cancer slope factors listed for vinyl chloride were used for MTCA or EPA equations, or how they were used in any case. If for MTCA equations, use only 1.5 per mg/kg-d (see comment 16, above). If for EPA equations using EPA-recommended cancer potency for this chemical, use only 0.72 per mg/kg-day. The EPA equations are different for early-life plus adult exposures than for adult-only exposures, but the potency values remain the same when there is less than lifetime exposure, such as for the assumptions at this Site. EPA Region 10 is not opposed to using the 1.5 per mg/kg-d slope factor in standard EPA residential and commercial/industrial equations to comport with the Ecology policy on this issue. The BRA needs to be transparent as to how vinyl chloride has been assessed in this regard.

- **#E-53. Table 2-9d, Inhalation cancer toxicity values (Marcia Bailey, 12/20/2011):**

- a) The title should be changed to "Inhalation Cancer Potency Values."
- b) See comment 31, above, regarding two (inconsistent) sets of inhalation tables in Version 9 of the BRA.
- c) Unit risks (ug/m3) (updated for the COPCs) should be provided for EPA equations while extrapolated inhalation slope factors should be provided for MTCA equations. The inhalation unit risk for vinyl chloride

for EPA is 4.4×10^{-6} per $\mu\text{g}/\text{m}^3$ for EPA (using different equations depending upon potential exposure to children or adult-only exposures; see the RSL equations.)

- **#E-54, Table 2-9e, Acute inhalation toxicity values (Marcia Bailey, 12/20/2011):** These should be consistent with the source of acute toxicity inhalation values presented in EPA's *Human Health Risk Assessment Protocol* for combustion (EPA 2005). See Section 7.4 in <http://www.epa.gov/osw/hazard/tsd/td/combust/finalmact/ssra/05hhrap7.pdf>. The acceptable acute inhalation toxicity values sources are Acute RELs; Acute Inhalation Exposure Guidelines, AEGL-1; Emergency Planning Guidelines, ERPG-1; T temporary emergency exposure limits TEEL-1; and AEGL-2, in that order. If values are unavailable for any of the Site COPCs, the other sources listed in Table 2-9e may be included.
- **#E-55, Tables 2-10a through 2-10g, cancer and noncancer risk summaries (Marcia Bailey, 12/20/2011):** These need to be updated for current toxicity, potency, primary target organs (where applicable), exposure (for groundwater due to the inclusion of inhalation) and corrections for vinyl chloride potency values, depending upon what cancer potency numbers are used for vinyl chloride (see comment 31, above).
- **#E-56, Table 2-12b, Toxicity factors used in assessing fish consumption (Marcia Bailey, 12/20/2011):** The reference doses and slope factors should be updated to inform the risk and hazard estimates. It is not clear – but should be – whether the fish consumption risks were based on EPA or MTCA equations. If MTCA was used, the source for the slope factor of 1.5 per $\text{mg}/\text{kg}\text{-day}$ for vinyl chloride should include the Ecology CLARC database, which establishes the policy for MTCA that the higher slope factor should be used when pregnant women may be exposed. (The MTCA 730 surface water equations based on fish consumption are based on adult-only exposures.)
- **#E-57, Table 2-13a, Values and equations used for daily intake calculations – domestic groundwater use (Marcia Bailey, 12/20/2011):**
 - a) It is not clear how an exposure time for showering of 0.58 hours/day was obtained from EPA 2009a (RAGS Part F). Please provide details. RAGS Part B discusses exposure to groundwater from multiple exposures in addition to drinking and showering in indoor quarters.
 - b) It is not clear how the volatilization factor of 0.5 L/m^3 was obtained from EPA 2009b (Water Quality Criteria). Please provide details. The standard reference for volatilization factor is RAGS Part B.

- **#E-58, Table 2-13b, Inhalation noncancer toxicity values (Marcia Bailey, 12/20/2011):**

- a) Please update toxicity values, primary target organs, uncertainty factors, and sources, as appropriate.
- b) There are notations (1) and superscript (2) that have no footnotes. Please provide as appropriate. There should be a note that extrapolated inhalation RfDs are for use only in MTCA inhalation equations.
- c) See comments on Table 2- 9b.

- **#E-59, Table 2-13c, Inhalation cancer toxicity values (Marcia Bailey, 12/20/2011):** See comments on Table 2-9d.

- **#E-60, Table 2-13d, Noncancer Risk Summary for Inhalation of Vapors during Showering (Macia Bailey, 12/20/2011):** This table should not be necessary when inhalation of volatiles from use of groundwater indoors (including drinking) is included in the main part of the risk assessment. Note that showering (per RAGS B) is not the only additional exposure to drinking water for indoor water use.

- **#D-53, Tables for Ecological Risk Assessment:**

- a) Tables 3-1, 3-2 and 3-3 need to identify that these are for Ecological Risks in the table titles.
- b) Titles should also state Contaminants of **Potential** Concern for Tables 3-1 and 3-3.

KTR Response (Revision 9, Oct. 2011): Table titles have been edited to include "Ecological" and "Potential."

EPA Response (Tamara Langton, Dec. 2011): These changes have been made, and the response is acceptable.

FIGURES

- **Comment #D-51, Figures 1-1 thru 2-1:** Please ensure that this report contains the most current revisions of these figures.

KTR Response (Revision 9, Oct. 2011): *Current versions of the figures have been included.*